ume XXIX Number Three Autumn 1950

Bell Telephone MAGAZINE

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Bell System Well Prepared for National Emergency

The Kind of Service Our Customers Want • CLIFTON W. PHALEN

"Business Office—Miss Smith Speaking" • J. W. ORD

Business Is a Good Neighbor, Too • KENNETH P. WOOD

The Magic Box That Opens the Door to Education
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merican Telephone & Telegraph Company · New York

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A Medium of Suggestion & a Record of Progress

Published for the supervisory forces of the Bell System by the Information Department of AMERICAN TELEPHONE AND TELEGRAPH CO., *195 Broadway, New York 7, N. Y.*
LEROY A. WILSON, *President;* CARROLL O. BICKELHAUPT, *Sec.;* DONALD R. BELCHER, *Treas.*

XUM

Who's Who & What's What

in This Issue

THE PRESENT ARTICLE is the second contribution to this MAGAZINE by CLIFTON W. PHALEN, who is A. T. & T. Vice President in charge of Public Relations. His "How Western Electric Serves Telephone Users" appeared here just two years ago, in the issue for Autumn 1948. He joined the New York Telephone Company as a lineman in 1928, and within the next ten years he had progressed through that company's Plant Department to become division construction superintendent of the eastern division. He became division plant superintendent in the same division in 1939, and in 1943 made the shift to the Personnel Department as assistant vice president. There he became vice president in 1944, and his transfer to Vice President in charge of Public Relations of the New York Company preceded by three years his election to similar office in the A. T. & T. Company.

LIKE MANY ANOTHER versatile telephone man, J. W. ORD has had experience in both Traffic and Commercial Departments. But, unlike most Bell System people, he was born in England. He began his telephone career, in 1913, with the Bell Telephone Company of Canada, and there he progressed, with an interlude of five years out for war, until he came to the A. T. & T. Company in 1926. Since then he has been, in the Commercial Division of the O & E Department, an engineer, general commercial problems engineer, sales engineer, commercial results engineer, and, since the first of this year, business office engineer. The issue of this MAGAZINE for Summer 1944 carried his "We Don't Like to Say 'No.'"

THE STUDY which KENNETH P. WOOD makes of the complex and beneficial interrelationship between a community and the telephone organization which serves

Clifton W. Phalen

J. W. Ord

Kenneth P. Wood

Harold G. Weissenberger

Philip H. Miele

it puts the spotlight on a situation which is much more often taken for granted than it is recognized. Beginning as a student with the Illinois Bell Telephone Company in Chicago in 1930, Mr. Wood held several positions in the Traffic Department during the next ten years. In 1940 he transferred to the Public Relations Department as employee information supervisor, and he was appointed successively general information manager, general news service manager, and again general information manager but with greatly broadened responsibilities. In 1948 he was transferred to New York as assistant vice president in charge of public relations activities of the Long Lines Department of the A. T. & T. Company; and on June 1 of the present year he moved over to the parent company's Information Department as assistant vice president in charge of national advertising and the publication of System booklets and kindred matters.

ANOTHER EMPLOYEE who started as a student in 1930 is HAROLD G. WEISSENBERGER, who joined the Bell System in the Plant Department of Long Lines in New York. He continued his academic studies while serving as transmission man and telegraph repeater attendant, and in 1940 he moved to the New York Division Commercial office. Here he was engaged as a commercial representative until 1946, when he went to the General Office as assistant on service problems and on private line development. He transferred in 1947 to the Commercial Division of A. T. & T.'s O & E Department, where he has since been active in the sales and servicing section of the new and special services group. Certain of the photographs which illustrate his article are used through the courtesy of the press, as follows: pages 170–171, Louisville (Ky.) *Courier Journal;* page 173, lower, Nassau (N. Y.) *Review Star;* pages 174–175, Kokomo (Ind.) *Tribune.*

NEWSPAPER REPORTING and radio news editing preceded PHILIP H. MIELE'S two years as a French interpreter at General Omar Bradley's headquarters in Europe. The war over, he continued his education, and graduated in economics. Since 1945 he has been with the Information Department of the Western Electric Company, where his assignments have included such matters as press relations and,

(*Continued on page 192*)

Symbolizing the Bell System's readiness to serve under all circumstances, this bronze and marble group stands in the lobby of the A. T. & T. headquarters building at 195 Broadway in New York

The System's Capacity to Serve Has Doubled Since the Start Of World War II. Much Work Is Still to Be Done, but Good Progress Is Being Made

Bell System Well Prepared For National Emergency

The following is the text of a statement made public at the end of last September. EDITOR.

THE BELL SYSTEM is well prepared to meet the present emergency. The plant is twice as large and greatly improved over ten years ago. New methods of communication, not even in the plant at the start of World War II, have been introduced and are being used extensively. The skills of telephone men and women were never so far advanced as they are today.

There is, however, more to be done—both in providing service to those who are waiting and in meeting the demands of the present emergency. Telephone men and women realize the nature and importance of the job that lies ahead. Plans have been made, and the Bell System is moving right ahead with the work.

MORE THAN a billion dollars a year has been spent by Bell System Companies since the last war to expand and improve the nation's telephone communications network—an important part of the strength of the whole country.

The number of telephones in service has doubled since 1940 and now stands at 35 million. Of these, 74 percent are dial operated, as compared with 59 percent when World War II started.

Bell Telephone employees are now 600,000 strong. Like the plant they operate, their number has nearly doubled since 1940. With the experience gained in hurricanes, sleet storms, fires, and other disasters, they have the ability and spirit to handle future emergencies that may arise.

In the last few years, great strides have been made in extending and improving long distance service. Thousands of new circuits have been

added, but today's high calling rates mean that many more must be built into the plant. New methods of making long distance calls have been developed, installed, and expanded.

"Operator toll dialing," coaxial cable, and radio relay are examples of new developments. Today, one-third of the long distance calls in the United States are "dialed" directly by switchboard operators. There are three and one-half million circuit miles of coaxial cable in operation. Fourteen radio relay networks, totaling about 8,000 channel miles, are in service along heavily-used long distance routes. A transcontinental route is scheduled for completion next year. Both coaxial cable and radio relay are vital links in the nation's communications network. In 1940 these services were only in the experimental stage.

Another new development is mobile telephone service—also a valuable asset to the nation's emergency potential. Ten years ago only one city in the United States had this service; today there are 140. Portable emergency radio-telephone units are also available and are located at over 100 strategic places. In the event of bombed-out facilities, they can be used as a bridge to the nearest operating long distance circuit.

MUCH is being done to make telephone plant and property as "trouble proof" as possible. Safeguards are being taken to prevent access by unauthorized persons where important mechanical equipment is housed. Key manholes have been locked. Emergency power supply has been provided in substantially all locations. Telephone employees have been alerted to the possibilities of sabotage, and the importance of the secrecy of communications has been reëmphasized.

Telephone traffic control bureaus have reviewed their rerouting practices in the event of sudden loads or emergent situations. Routes for long distance traffic, river cable crossings, and important sections of exchange cable are being carefully scrutinized to insure that alternative routes are provided where needed. Special emphasis is being given to military locations.

Emergency telephone restoration plans are being established in key cities. Facilities in communities around the perimeter of these cities are being rearranged and new routes provided so as to tie in directly with substitute long distance centers in the event that the normal city toll center is bombed out.

Against this background of greater capacity, new equipment and methods, and experience in protecting and maintaining service, the Bell System is squaring away to the still bigger job ahead—the responsibility of meeting the growing needs of the government for defense and military purposes. How big that job may become, no one can foretell. But progress has already been made, and the Bell System will continue to serve the nation with every resource at its command.

THE TELEPHONE COMPANIES are coöperating closely with the government on many special communications projects. Important among these is the provision of telephone facilities for the Air Defense Communication System, or "radar network." Work

on this is well under way; more is scheduled.

Thousands of miles of private line networks have already been provided to the military. Also, it is the job of the Bell System to furnish local and toll facilities to widely scattered military bases and training camps over all the country. This is a big job—it will require much construction—but the System is moving ahead with it.

The Telephone Companies are working closely with civilian defense authorities on disaster plans, and on defense warning networks. Local telephone people have assumed key responsibilities in these projects. The existing nation-wide network of long distance circuits will be of immeasurable help in coördinating the national civilian defense job.

During the last war, the Western Electric Company, the Bell System's manufacturing and supply unit, was the nation's largest producer of gun directors, radar equipment, radio and telephones and switchboards for military use. Western worked in close coöperation with Bell Laboratories, which completed over 1,200 military projects. These organizations—with the skill and know-how developed in two World Wars and with years of telephone experience—are again coöperating closely with military officials in many important activities.

IN SUM, a great deal of work has been done, but the job ahead is important and very considerable. Times like these emphasize the benefits of past growth and the value of a strong, healthy telephone company to serve the country's needs. The vast challenge of contributing to the security of the nation must be met. In meeting that challenge, the Bell System is moving ahead with confidence, based on the fact that this country already has by far the best telephone service in the world—furnished by a seasoned organization of service-minded men and women.

Friendliness, Sincerity, and Integrity Are Qualities Which Add a Plus Value to Telephone Service

The Kind of Service Our Customers Want

Clifton W. Phalen

THE BELL SYSTEM EXISTS to serve people, and serving people seems to me to mean giving them what they want—in our case, the kind of telephone service they want.

My own belief is that the public look to us for about three things.

First, I am sure they expect a technically high-grade telephone service. They want fast service, they want to hear and be heard easily when they talk by telephone, and they want to feel that the service is dependable—that they can count on it whenever they need it. In fact, most people have come to take these qualities for granted.

One reason for this is that we have, by providing technically good telephone service over the years, educated the public to expect that kind of service as a matter of course. In addition—and this seems to me an important factor—industry in general has done such a good job that people have become accustomed to technical excellence in most of the things they buy and use. They aren't inclined to accept failures or shortcomings. On the contrary, when a person gets used to a high standard, it's easy for him to be critical of anything that isn't quite up to par. This means that our service must continue to be extremely good, in a technical sense, if we are successfully to stand comparison with other industries.

People Are Used to Seeing Things Improve

THE SECOND THING our customers expect from us is closely related to the first: they want a service that is not only good but is constantly getting better. And here again the public's expectation is based on observation and experience with other industries, as well as on experience in using the telephone.

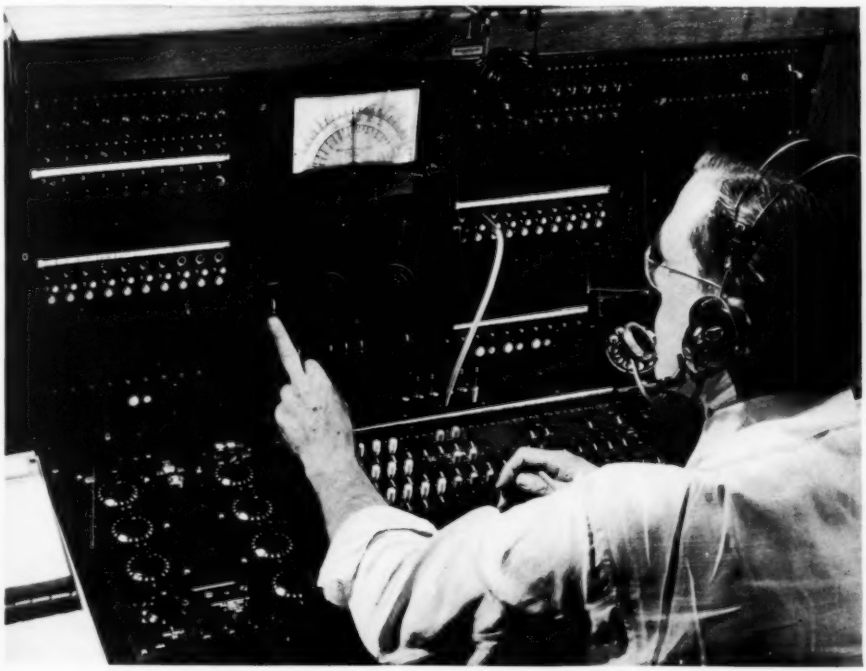
Of course, the average man today buys better telephone service—much

better—than in years gone by. He also buys and enjoys better automobiles that run on better gas and roll on better tires. His wife has a better washing machine that uses better soap. They both listen to a better radio and watch television on a better set than they could have bought only a short time ago. They use new household utensils made of new kinds of plastics. Their clothes and perhaps their curtains and rugs are woven from new kinds of yarns, and there's more white meat than there used to be in the average chicken dinner.

In short, the public are practically bombarded by improvements coming at them from all directions. And they would think it strange indeed if their telephone service did not improve through the years along with everything else.

Fortunately for everyone, the record of telephone service over three-quarters of a century is a record of steady and remarkable progress. We have always been well up front in the progress parade and that is where we expect to stay.

Our progress is the kind that catches the ear, so to speak, rather than the eye, for we don't introduce a new and shinier model each year. Indeed, one of the challenges that forever faces our scientists and engineers is that all apparatus must be so designed that today's newest tele-



Constant vigilance at the test desk plays an important part in maintaining the dependability of telephone service

Use of mobile radio telephone service has been extended from one city to 140 in the last decade

phone transmitter can work perfectly through a last year's switchboard and a section of pre-Pearl Harbor cable.

But 1950 telephone facilities and service are measurably ahead of 1949's in many respects, and so far ahead of 1925's that the latter are not much more than basically similar. Many of us are already familiar with the long record of telephone pioneering. Step by step, year by year, the range of service has been increased and hearing made easier, connections have been put through faster and facilities made more convenient and dependable. But we don't need to recall past history to get the evidence of progress. It is all around us today.

For instance: Three-quarters of the Bell System's telephones are now dial-operated, compared with two-thirds at the end of the war. The average telephone now is out of order only about once in two years—half as often as a few years ago. Operators today are dialing about a third of all toll and long distance calls straight through to the distant telephones, and the proportion of calls handled in this way will continue to increase. Local calling areas are being enlarged, customer dialing of toll calls is also on the increase, and automatic message accounting systems are being installed that will permit more and more telephone users

to dial their own calls to out-of-town points. Telephone service for automobiles, trucks, and moving trains has been transformed from a plan to a reality. An improved telephone instrument, which talks more clearly, rings more pleasantly, and is easier on the eye, is out for test. Service for farmers and for all in rural areas is being vastly expanded and measurably improved.

These are just a few current and conspicuous examples of the forward march of telephone service, and they illustrate the improvement that our customers have learned to expect.

Friendliness, Sincerity, Integrity

WHEN PEOPLE receive a technically good and ever-improving service, one might ask what more they could want. I think the answer is plain. There is a third desire which the public feel—one that springs from a deep-rooted aspect of human nature. It affects not us alone, but pretty much all service businesses, and it has a value that would be hard to overestimate.

People like to be surrounded by other people who are friendly, pleasant, easy to get along with.

People like to deal with other people who take a sincere interest in their problems, and who are willing to give them a little special attention.

People have respect and admiration for straightforward dealing, upright conduct, integrity.

Friendliness. Sincerity. Integrity. Intangible they are, but remote from the telephone business they are not. For if our customers admire

A group of friendly and pleasant people, visitors at a Telephone Company "Open House," are enjoying their guide's explanation of "Information's" function

Bell System drivers, courteous as well as careful, are often good friends to meet on the road

and respect these qualities in their friends and associates, they will also admire them and be gratified to find them in a business such as ours. When we render a friendly, courteous, trustworthy service, we are responding to a basic desire of the people we serve. And it is perfectly natural for us to respond in this way, for telephone men and women, like any good citizens, are naturally inclined to be courteous and friendly and upright. Therefore it is not a difficult job to make those qualities apparent in our day-to-day activities.

Opportunities to Serve Our Customers

WITH 19 BILLION personal contacts between operators and customers in the course of a year, think of the opportunities to demonstrate that "The Voice with the Smile" is no catch phrase, but a cornerstone of our service philosophy. Most of those contacts may be limited to "Number, please . . . Thank you"; but each one is personal, and a friendly tone of voice is always good to hear. And this is true of every kind of call—the local and long distance calls, the calls to "Information," the calls which connect with intercepting operators. All can reflect the warmth of a friendly desire to please.

That is the kind of service, for instance, which could bring a spontaneous letter of thanks to the president of one of our companies "from my mother and self for the courteous and very efficient service rendered us 'by telephone' over the past 40

years" . . . and for the "courtesy and kindness that come 'over the line' . . . making life less difficult and at times happier."

IN ALL PARTS of our business and in all kinds of jobs, the acts by which courtesy, friendliness, sincerity, character are expressed are as individual as the people who perform them. Yet there is a common denominator of good will in all.

"What a pleasure it is to do business that way," wrote an Army officer who had occasion to visit a telephone business office. And of the service representative who took care of him he reported that "she had all the desired information at her fingertips and . . . seemed very happy to help in any way."

No less "happy to help" was a man employed in a telephone business office who was able to assist a customer in a different way. When a bulldozer out of control ripped down the telephone circuits between the city where he worked and a nearby suburb, he and a colleague hurried to the suburban central office in a company automobile equipped for mobile radio telephone service—over which emergency calls could be made. While testing the lines in the suburban office, the other man picked up what seemed to be an emergency call. The customer's voice was faint, but he was able to make out her number, and told her somebody would call her right back. The business-office representative made the call at once, by the radio telephone in the car, and was answered by a woman whose baby was ill and who was trying frantically to reach her doctor in the city. The representative offered to make the call for her, but she felt that she must speak with the doctor herself. He then invited her to come to the central office and use the radio telephone in the car; but the customer, increasingly upset, replied that she would have to drive to the city and talk with the doctor there. Realizing that the woman was greatly disturbed, and was preparing to leave her sick child alone for a considerable period, the telephone representative offered to drive the telephone-equipped car to her home. She welcomed this offer, and he had the car before her door in short order and proceeded to establish the connection

In the business offices, courtesy and sincerity go along with a thorough understanding of the tangible elements of good telephone service

Telephone operators have literally billions of opportunities in the course of a year to show that "The Voice with the Smile" is a warm and living concept

to the doctor for her. She then talked directly with the doctor, via the mobile radio telephone, and not only obtained the information she needed but was reassured because it had not been necessary for her to leave the child alone.

ACROSS THE street from a telephone company supply yard lives a little boy, who watches with lively interest the comings and goings of the Plant men whose base it is. He hasn't had much else to do, because he is bedridden—but he has more to amuse him now. For when the men found out about him, they bought him a phonograph and some records — despite the fact that there is nothing in Plant Specs which covers that particular situation.

Nor is there any specification which requires a telephone man to stop his car or truck on the road to help somebody who is having difficulties. But they do it often, and so demonstrate their own good will and win more of it for the Company. To one customer, a college professor, such an instance was evidently the culmination of many favorable impressions, for he wrote: "We have recently changed to the dial system in our little town. When the man came to install our phone, I just thought how fortunate we are to have a great company interested in really serving the nation, and of how little each person really pays for all the expense involved in keeping such an intricate communication system going. Then just this week my wife ran the car into the ditch accidentally. A lineman came along and courteously offered his assistance. . . . Your lineman need not have stopped, but he did, and thus exhibited the courtesy and efficiency which are a part of your great corps of workmen. . . ."

THE traditional spirit of service of

the telephone operator finds its expression in many ways—some of them dramatic, others just kind. An instance of the latter was given by the service assistant at an attended telephone location in a big railroad station who noticed a youngster, forlorn and in tears, in a telephone booth. When she found that he had missed his connection and felt lost, she called his mother and assured her the boy would be on the next—and right—train. But it brought a letter to the Company from the boy's father in which he said: "When you have employees going out of their way to aid in the personal problems of a customer, I feel it worthy of commendation. May I extend through you to Mrs. ——— our deep appreciation?"

Another incident with a happy ending was a town official's urgent search on a Sunday afternoon for a source of anti-rabies vaccine. While he was able to give the telephone operator the name of the concern and of the city in which it was located, he put into her hands the problem of finding on a Sunday in Spring somebody who was authorized to accept an emergency order and make a speedy shipment of the vaccine. The operator got her man, promptly, and the relieved town official wrote to the Telephone Company to express his gratitude to her. He added, "We are apt to get in the habit of expecting exceptional service without being properly grateful to employees and concerns which render such service, but in this case I do wish to thank everyone who helped and I know the doctor and his patient would wish to join me in this expression."

THE POINT illustrated variously by these instances is clear enough. The operator or the Plant man who makes a little extra effort, the business-office service representative who makes sure she understands the customer's problem and then follows through carefully to a successful outcome—it is the combination of thousands of such actions of all kinds, little and big, thoughtful, courteous, character-full, which give our business its reputation for warmth of heart as well as for technical excellence of service.

When we provide—as we do—a telephone service that is very good by technical standards, and is also constantly improving, we undoubtedly win the respect of our customers. But when we add to our technically good service the important qualities of friendliness, sincerity, and integrity, we gain something more, which is the friendship of the public. And in so doing, we add interest and fun to the job and gain a greater satisfaction from our daily work.

Proof of the Pudding

WHAT I am talking about can't be fully expressed in statistics. But the statistics we have do indicate that there is a direct connection between the way we treat our customers and the way they feel toward our company—that people who feel they have been treated in a friendly and courteous manner feel also that the Company's general reputation is good. In our customer surveys, for instance, we ask people whether they are treated by telephone people the

way they like to be treated. Of all the people who answer "Yes," 84 percent say that the Telephone Company's reputation is excellent or good. Of those who answer "Sometimes not" to the question, only 38 percent say that the Company's reputation is excellent or good. It looks like more than a coincidence.

A frequently heard comment from members of the public, when telephone service or the telephone business is under discussion, runs something like this:

"We can understand how you folks do the good technical job that you do. But the great thing to us is that in a business the size of yours, with the tremendous number of employees you have, your people are so friendly and so courteous. It is a wonderful way to do business, it seems to us, and one of the greatest public relations assets you could have."

The very fact that this kind of comment occurs so often indicates that a great many people are genuinely impressed by what we are doing.

It also indicates the rightness of our continuing efforts to deal with people on the simple basis of friendliness, sincerity, and integrity.

A POPULAR FEATURE of Chicago's Lake Front Fair was the telephone exhibit, called "The Bell System Presents . . . The Telephone of Tomorrow," which attracted more than a million visitors.

At the conclusion of a demonstration of the intricate Automatic Message Accounting equipment, the Illinois Bell girl who had given the demonstration noticed a woman still standing by the exhibit.

"Have you a question?" she asked.

"I certainly do, young lady!" was the reply. "Tell me, if this is such marvelous scientific equipment, why wasn't it invented years ago?"

After the demonstrator had tried bravely to answer that one, the woman, still unconvinced, left the exhibit with this parting gem:

"You folks are so far ahead in some things and so far behind in others, why don't you just stop everything until you get caught up?"

Equally puzzled was the large and elderly colored woman who approached the voice-mirror equipment but who appeared hesitant about using it. The telephone attendant invited her to try it, but she replied bashfully that she wouldn't know what to say. He offered various suggestions, and the woman finally agreed that she would speak her address.

Into the microphone she then said "Ah lives at 1234 Such-and-such Street, heah in Chicago."

There came back to her, of course, her own voice and words: "Ah lives at 1234 Such-and-such Street, heah in Chicago."

Her eyes widened as she listened, and a smile came over her face. "You do?" she exclaimed. "Mah goodness—we must be neighbors. That's where Ah live too!"

The Objectives of Bell System Business-Office Service to Customers Include Courtesy, Understanding, and Helpfulness In Addition to Efficiency

"Business Office—Miss Smith Speaking"

J. W. Ord

IF YOU were to ask Miss Smith, a service representative in the business office of a Bell System Company, about her work, she would probably tell you something like this:—

"I am a service representative handling a group of about 2000 customer accounts, and it is an interesting and challenging job.

"I keep the records of these customers' service.

"If they have some business matter they want to discuss with the Company, I handle it.

"Their telephone calls and visits may be about all sorts of things: inquiries about rates, orders for service, some question about a bill, or a difficulty they want adjusted.

"If they want information, I either give it to them or see to it that someone else does.

"If they want something done, I take care of it or make sure it gets the proper attention.

"I am also responsible for the collection of these customers' bills.

"My job requires me to deal with the other departments of the Company and to know quite a bit about what they do.

"There is a lot of variety in my work. That is one reason why it appeals to me. Another is that I like dealing with people and helping them.

"I feel I have much responsibility, and opportunity to use my own judgment."

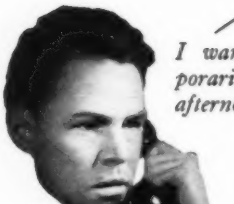
WHY is this business office job so appealing to Miss Smith and her thousands of colleagues? It is largely because of the Bell System's concept of the place of the business office in telephone company operations, the high standards set for its service and customer relations and what is done to insure meeting them.

Is there anything you can do about the other parties on this line using it so much? I never can get my calls through

I'd like to have you extend the time for payment of my bill until next Friday

I want to know whether the man will be here before three o'clock to move my telephone. I'm waiting to go out

Tell me—can I deduct the telephone tax from my income tax?



I want my telephone temporarily disconnected this afternoon. There's a funeral at our house

Could I get a telephone in that new housing development a mile outside the city limits on the Blackville road?

A challenging feature of the service representative's job, which helps to make it particularly interesting, is the great variety of matters she is called upon to handle for customers

Where the Business Office Fits In

THE BUSINESS OFFICE has been established as the place for customers to get in touch with, as one Bell telephone company tells them in the telephone directory, "to arrange for changes in your service; answer questions about your bill; furnish information on other telephone matters or help you in any service difficulty which has not been taken care of to your satisfaction."

The business office also has other functions which are handled by other employees, and not by service representatives, such as handling payments from customers, coin telephone collection work, and typing of orders for service.

The Bell System believes that only the best possible handling of business-office contacts is satisfactory to customers. The volume of these contacts alone would make them important: some 85 million a year, with 25 million telephone customers, handled by 17,000 service representatives. Beyond any quantitative measure is the matter of the character of these contacts and the reaction of customers to their handling. A wide range of subjects comes up in these contacts—one study showed 200 different topics in each 1000 contacts—and customers generally feel that the business office is speaking for the Company, reflecting the policies of management and its interest in its customers.

Customers will not think the business office effective unless they feel they have achieved their purpose in calling on it. Here arises an interesting situation, because the service representative must often get in touch with another department for information or to get the proper action to meet a customer's request. If customer achievement of purpose is to be assured, there must be good interdepartmental teamwork. The service representative must know enough about other departments' operations to be able to recognize when they are involved, to understand what the other department needs to know in order to do its part, and to keep in mind what that department can be expected to do.

THE COMPLETENESS and accuracy with which service representatives obtain and transmit to other departments the information necessary for them to understand properly and carry out customers' wishes or orders for service have a substantial effect upon the accuracy of the departments' records and operations. Accuracy in transmitting information about an order for telephone service, for example, can directly affect the accuracy of billing, directory listings, and type of service installed, or the keeping by installers of appointments with customers.

Another aspect of interdepartmental teamwork concerns the support given the business office in its role of spokesman for the Company. Where, as is often necessary, the service representative holds the customer on the line while she telephones another department for information, the employee answering in the other department should be as alert and prompt in furnishing the desired information as if talking directly to the customer. In addition, all employees concerned, whether in the business office or not, must con-

sider a commitment made by a service representative to a customer as one made by a representative of management—as indeed it is, especially from the customer's viewpoint.

Philosophy of Service

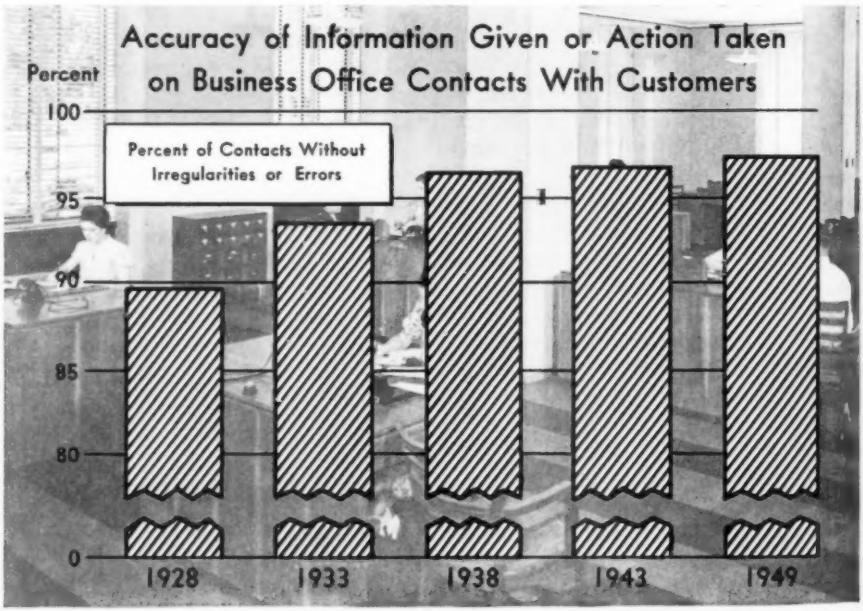
THE IDEAL of a high quality service has, therefore, been set for the business office. It must be translated into a reality through the medium of people: people who, day by day, deal with other people. Reality has been made practicable by developing out of continued study of experience specific standards of service which have been codified for the guidance of service representatives.

These standards start with the proposition that service should be accurate and complete with respect to information given or action taken.

Service should also be prompt, particularly in two respects: (1) customers should receive prompt attention when they call, visit, or write the office; and (2) if a customer is held on the line while the service representative consults her records or calls another department, the representative should return promptly to the line and not keep the customer waiting and wondering what is happening.

These are what might be called the technicalities of good service. They promote efficiency. But an organization can be efficient and yet not be considered by the public as friendly, human, and helpful. It might appear, for example, distant, arbitrary, or machine-like.

This suggested consideration of how people like to be treated and continuing study along these lines has resulted in an approach known as "Overtones of Service." During the last war it proved so stimulating in



improving the handling of contacts that there has been most intensive development of it as an aid in training and inspirational leadership.

The overtones approach focuses attention upon several elements.

Courtesy is, of course, essential but it must be natural and sincere.

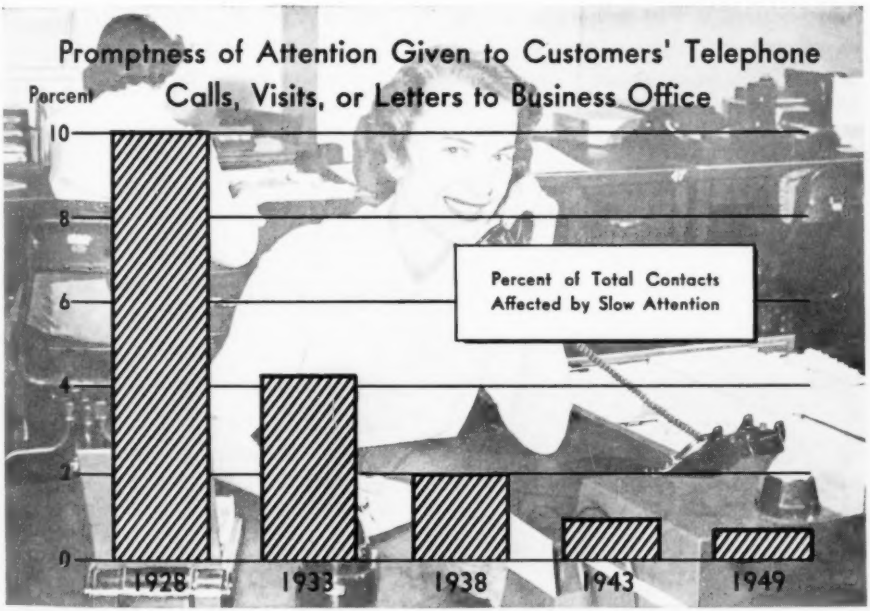
People like to receive individual attention as opposed to routine treatment.

Customers' contacts should be so handled that they feel it is easy to get an understanding and sympathetic hearing of their situation or difficulty from the telephone company. This includes recognition of unusual situations warranting action beyond the normal routine and avoiding giving customers the impression of being met by an arbitrary rule without regard for their individual problem.

It is important, of course, that the customer properly understand the Company's viewpoint, particularly where his request cannot be granted for some good reason. No matter how good Company operations and practices are, they sometimes require careful and clear explanation to be properly understood and appreciated as reasonable. This also applies to discussion of the effect of some condition beyond the Company's control—war or storm or some other emergency, for instance—when the customer might not otherwise realize what is confronting the Company and what steps the Company is taking.

Telephone contacts warrant special consideration, since the customer cannot see the service representative and forms his impressions largely from her voice and manner.

Of outstanding importance is to handle all contacts in a spirit of helpfulness—a sincere and evident service attitude.



SERVICE ITEMS	OBJECTIVE
SPEECH	Clear and distinct—simple straightforward language—"Voice with a Smile"
COURTESY	Good manners and business etiquette—natural, spontaneous and sincere
UNDERSTANDING THE CUSTOMER	"Tuning in" with the customer—making sure his request and point of view are fully understood.
QUALITY OF EXPLANATIONS	Making sure that the customer understands our explanation and feels that the Company's handling of the matter is fair and reasonable.
SERVICE ATTITUDE	Sincere interest in serving the customer and alertness to all opportunities to be genuinely helpful.

Overtones of Service objectives in business office contacts with customers

This "overtones" approach is not a cloak to be put on or taken off at will. It must be a motivating spirit in the conduct of the job.

To insure that these high objectives are given practical day-to-day application, the service philosophy has been woven into the processes of selection, training, and supervision. In addition, a plan has been established for the continuous analysis of the quality of service being rendered in handling contacts with customers, from the standpoint of good overtones as well as accuracy and promptness. This has proved most effective in maintaining the interest of the force and insuring that full advantage is taken of opportunities for improvement.

Collections

THE BUSINESS OFFICE is responsible for collecting customers' bills,* as Miss Smith said. Success in collections is just as vital to the large telephone company as to the small business man. Currently, about a third of a billion dollars must be

* See "You Can Tell by the Teller," MAGAZINE, Spring 1949.

collected each month—much, although not all of it, of course, consisting of relatively small bills for the 21 million residence customers. Most customers pay their bills when due; but for one reason or another some do not pay on time, and, while the percentage who don't is not great, the amounts involved can add up to substantial sums.

In establishing rates for telephone service, the Company assumes that bills are paid promptly, and it is also quite important that uncollectible or bad-debt losses be kept to the very minimum. Good customer relations require that this collection work be done with the least possible irritation to customers and in a manner which is considerate and respectful, yet businesslike and, where necessary, firm.

Since the collection job is a sizable one, it cannot be permitted to lag. Yet there is no intention of handling collections on an assembly line basis and everything practicable is done to assure individual attention to each customer's account. One reason why work in the business office is so organized that each service representative is given charge of a specific group of customer accounts is to facilitate getting a personalized collection job done and featuring an important point—promoting the habit of prompt payment without reminder.

As every business man knows, much business judgment is necessary in collection work; it cannot be done sensibly just by following a list of iron-clad regulations. Dealing with all kinds of customers under all manner of circumstances raises many a delicate question, such as—should we require a deposit on this account; how and when shall we approach this customer to pay his overdue bill; how should this request for an adjustment be handled; should we grant this request for extension of time in which to pay the bill; or how can we collect that final bill? The judgment of individual service representatives grows with experience but a good deal of effort goes into developing their ability to arrive at sound business decisions, combining good collection and good customer relation judgment.

Problems of Facility Shortages

UNUSUAL operating or facility conditions, such as prolonged shortages of telephone facilities, may afford a very severe test of the business office in dealings with customers.

During the severe facility shortage of World War II and operation under the War Production Board limitation order U-2, the service representative group did an outstanding job.* In the face of extremely difficult conditions they so handled contacts as to insure customer understanding of the situation, confidence in the Company's handling of it and recognition of its continued interest in customers even when it could not fill their orders.

This test did not cease with the end of the war. During the eventful post-war years, the Companies have been confronted with an unprecedented and continuing demand for service. To meet it, the System has undertaken the biggest construction program in its history—and the largest peace-time program of any private enterprise—spending well over

* See "We Don't Like to Say No," MAGAZINE, Summer 1944.

five billion dollars for the expansion and improvement of service. As a result, telephones in service have been increased by about 13 million. The waiting list has been reduced to very small proportions—usually about two percent of all telephones in service—although there are some places where demand for service has persisted at such high levels that somewhat more delay in furnishing service has unfortunately been unavoidable.

In order to keep to a minimum the number of customers waiting for service, the Companies have tried to serve as many people as possible with existing facilities. They have asked new customers to take party-line service and existing party-line customers to retain it. This has seemed the most equitable thing to do under the circumstances—although it is fully recognized that party-line service doesn't fully meet everybody's needs.

The post-war years have thus brought to the service representatives a double challenge. They have had to so handle contacts as to maintain the confidence of applicants for service by assuring them that, despite the delay in furnishing it, the Company is doing a tremendous job in furnishing facilities as fast as possible, and that, as facilities become available, service is furnished to each applicant strictly in his proper turn. At the same time, service representatives have had to make the facts of the party-line situation clear to customers who want a better grade of service. With such large numbers of customers on party lines, the service on party lines must be made as satisfactory as possible. For this reason, the Companies have been quite active in many ways in encouraging party-line customers to be considerate of others in their use of the line, and service representatives help by discussing party-line coöperation with customers on lines where difficulty is reported, a

Yesterday's customers stood at counters in public offices to transact their business with the telephone company

Today, public offices afford greater convenience and privacy for customers, who can transact business while seated at representatives' desks

matter sometimes calling for much diplomacy.

It is a tribute to the sincerity of purpose of service representatives and to the leadership of the supervisory organization that despite the continuing high demand, the length of time shortages have lasted, and the large volume of orders and inquiries handled (over 35 million a year), the interest of the group in customers and their telephone needs has been fully maintained.

Selection, Training and Supervision

SERVICE REPRESENTATIVES must be selected with great care. The first requisite is to subscribe wholeheartedly to the Company's philosophy of service. Service representatives require an unusual combination of qualifications. They should have the ability to absorb and remember a wide range of information, express themselves well, and have a good telephone personality. They should like to deal with people and be helpful. Patience, poise, alertness and quick understanding of the other fellow's viewpoint are necessary, as well as accuracy, clerical aptitude, and some skill in mental arithmetic.

Experience has shown the desirability of avoiding any tendency to "type" the business office force, as happens when recruiting is largely confined to any one source. To the contrary, there are advantages in having a group with mixed backgrounds as to education and previous experience (drawing upon various telephone departments as well as outside business). Association with such a varied group helps to develop a service representative's flexibility and understanding of different points of view and other department operations. Such acquired qualities are

most helpful in improving her ability to talk to all kinds of customers on a wide range of telephone company matters.

While much of a service representative's success depends upon her own natural ability and judgment, it is a matter of System policy to help her to develop both to the full extent of her inherent capabilities. Before being assigned regularly to her job, she takes an initial training course, of about six or seven weeks' duration, spent partly in the classroom and partly in learning by doing. The length of the course is governed by the amount of knowledge to be acquired and the need for practice in the best service and contact techniques in dealing with customers. Students of contact techniques will be interested in knowing that naturalness of expression is sought and the use of standard phraseology or "canned contacts" is discouraged.

Helping service representatives does not stop with initial training. One of the principal responsibilities of the business-office supervisors—to whom service representatives report—is to continue to assist them with the further development of their ability and judgment. The opportunity to graduate into and beyond this supervisory job provides a stimulating incentive to the ambitious telephone career woman.

For good service and economical operation, there must be an adequate but not excessive force on duty to handle the volume of work. Service representatives generally agree that they do their best work when reasonably busy. If representatives are too busy, the quality of service may be adversely affected—particularly accuracy, overtones, and personalized attention to collections. A plan has, therefore, been developed for measuring the volume of the different kinds of business-office work in terms of a common denominator known as work units. This has been made possible by the development, for each class of work, of a coefficient stating how many units of work the performance of one item in it requires on the average. The use of such information in measuring the total volume of work in the office and in forecasting future work volumes helps in insuring that there is proper force provision and that if additional employees are required they will be on hand, adequately trained, when needed.

Office Arrangements

EXPERIENCE DEMONSTRATES that environment has an important bearing upon the quality of the business-office job. Consequently, there have been quite a good many changes over the years in telephone company business offices. Where once customers stood at counters to transact their business, they now sit in comfort beside service representatives' desks, a convenience much appreciated by employees and customers. It makes for a better contact with a feeling on the part of the customer of greater privacy and more personal attention. The tone of service is further improved by providing attractive quarters, tastefully but not extravagantly appointed, with their general appearance in keeping with the community.

In the very large cities, the large volume of telephone contacts has made it necessary to establish "record" offices where only telephone

contacts are handled. Here too, a quiet, well lighted, orderly, and attractively arranged office promotes pride in the job with benefits to good overtones, concentration, and accuracy.

Much of the office equipment, records, and reference material has been "tailor made" for the service representative, so she will have at her fingertips the information most frequently used during contacts. This helps to insure accuracy and avoid delays looking up information while the customer holds the line. A specially designed desk, for example, provides for seating service representatives in pairs with a "tub" file between them containing such records as their customers' service cards, collection data, and the toll tickets charged on the last one or two months' bills—since these are the toll charges customers are most likely to ask about. Service representatives are seated in pairs so that, should a service representative be busy when one of the customers in her group calls, the other representative may take the call and be able to consult that customer's records without leaving her position.

In the "tub" desk files each representative has at her fingertips the records most frequently used in contacts with customers

THE BELL SYSTEM concept of business-office service, with its translation into day-by-day operations, should explain why the Miss Smith who began our story, and her thousands of associates, find their work so interesting, stimulating, and appealing. It promotes pride of accomplishment and a state of mind which thinks in terms of an ever improving service. Customers' reactions to this approach to service are impressive. Their appreciation is evident from comments, volunteered or in response to special checks, and in many other ways—such as, the understanding shown in what could have been critical situations; and their response to the handling of small matters which employees could have treated as routine but which offer real opportunities to let customers know that the Company is interested in them and glad to be of service.

Without actually visiting an office and sharing with service representatives their experience during contacts, it is rather difficult to recapture fully the challenge and appeal in the best possible handling of customer contacts. As a substitute, it may serve

to quote the words of another and anonymous service representative in concluding her discussion of her job during a recent survey:

"As a summary I would like to say that I am very happy in my work. My work is interesting, the people I work with and for are the very best, and our working conditions are very pleasant. There are very few companies where a woman can have a job where she is constantly with people that she would like to be with and where there is such a congenial atmosphere. Our work is varied to such an extent that it does not become tiresome. Every time you sit down at a desk you wonder just what is going to happen next and what unusual circumstances will arise. When a day is finished at the telephone company you leave work with a satisfied feeling that you've done a good day's work and that it was finished well."

WHEN THE American Telephone and Telegraph Company opened a stock transfer office in Chicago last Summer, the president of the Midwest Stock Exchange, Mr. James E. Day, was among those present at the occasion. The editor of the *Bell Telephone News* of the Illinois Bell Telephone Company thereupon invited Mr. Day to contribute a comment for publication, and the following paragraphs are quoted from his statement:

"The stockholder list of American Telephone is rapidly approaching the million mark. Such confidence is merited and earned. Good management and sound business policies have raised Telephone to the point where it is the largest public utility enterprise. Research facilities have been maintained to hold down costs through mechanization and increased efficiency as well as to develop new services for its customers. Here is free enterprise working for the public in two ways—promoting efficient communication service, and providing a fine investment medium.

"The company's growth has meant increased payrolls for more employees. Without its great record of expansion and earnings, there would be no means to provide the many privileges and benefits its workers now enjoy. This same growth pattern is beneficial to stockholders, as witnessed by dividend payments continued without interruption since 1881.

"This company represents one of the finest arguments for free enterprise in view of the fact that it is owned by the public and its employees and managed by men who have come up through the ranks. This management has been one of the first to recognize the value of investment bankers and brokers—not just for the purpose of raising additional working capital, but in its public relations with investors. They know and respect the fact that the broker is the man who meets their old, their new and prospective stockholders every day.

"Here is a great corporation operating under what we like to term the American Way of Life; i.e., privately owned rather than government owned. Compare this fine record with the results of nationalization of certain utilities abroad. We find in the latter not only the inability to develop products and service to compete in world markets but paying dividends to no one and providing a static record in employee benefits."

Industrial Statesmanship in London

President Truman's appointment of Mr. Walter S. Gifford, a Republican, as Ambassador to Britain has been justly hailed as a contribution toward strengthening bipartisanship in international affairs. But it is also recognition and utilization of the quality of industrial statesmanship which Mr. Gifford has exemplified during a long career.

Mr. Gifford has served the nation and New York City in many capacities. His survey of American industrial resources and his work with the Council of National Defense in World War I were successful pioneering ventures in a field whose tremendous importance is only now fully appreciated. He has given valuable assistance to such organizations as the American Red Cross, the Rockefeller Foundation and the Community Service Society. But his major preoccupation has been that huge and complex keystone of American communications, the American Telephone and Telegraph Company. President of A. T. & T. from 1925 to 1948, and then chairman of the board, Mr. Gifford has directed the growth of one of the largest and most efficient industrial networks in the world.

The talents necessary to hold such a post will be put to good use at the Court of St. James's. Because of its prestige, as well as of the organization of the United States foreign service, the London embassy is the heart of American diplomacy in Europe. It is good to know that the administration and inspiration of this delicate and essential operation will be intrusted to the tested skill and wisdom of Walter Gifford.

From the New York *Herald Tribune*

Telephone People Are Good Citizens, and the Bell System Puts Large Sums of Money into Circulation and Provides Stable Employment in Thousands of Communities

Business Is a Good Neighbor, Too

Kenneth P. Wood

EVERYBODY likes to have good neighbors: the family next door, friends down the street.

It is not boasting to say that telephone people are pretty good neighbors. They are the kind of people who feel responsible for the community in which they live and work. They engage in civic activities, and have a reputation for courtesy and friendliness.

Businesses, too, are neighbors. And for them, as with individuals, being a good neighbor is not solely a matter of being pleasant. Neighborliness is judged by how much a business—or a person—contributes to the general well-being of the community. The Bell System is very much aware of this fact, particularly with respect to furnishing telephone service that is high in quality and in usefulness.

Obviously, good telephone service is essential to the well-being of cities and towns throughout America. It is a necessity for business, vital in emergencies, and people everywhere rely on it for day-to-day personal and social use. In fact, life as we know it today would be practically impossible without the telephone.

This imposes on the Bell System a tremendous responsibility to make the service it provides as good as it possibly can. But beyond providing the best possible telephone service, there are many other ways in which the Bell System contributes to community prosperity—other ways in which it may qualify as a "good neighbor."

Large Sums Go to Communities

PERHAPS the most apparent of these, in its effect upon community welfare, is the money the System puts into circulation.

The operating payroll of the Bell System amounts to almost a billion

Attractive telephone buildings which harmonize with their surroundings are an expression of neighborliness and good citizenship

and a half dollars a year. This money, which is equal to about fifty percent of the System's total operating revenues, is paid regularly to people in thousands of communities, large and small, in every section of the country. The wages spent by telephone employees mean jobs and wages for people in thousands of other businesses.

The purchases of the Bell System Companies mean a lot of business for communities in every state in the Union.

The Western Electric Company, supply organization of the Bell System, alone bought from 23,000 different concerns in 2,500 cities and towns last year, and its purchases totaled more than three hundred million dollars.

The shopping list is practically endless, covering a great variety of products, from thumb tacks to motor trucks. Western's purchases during 1949 in Belleville, N. J.—to take just one typical community—amounting to about $375,000, included such items as paper, bags, files, rasps, felt, fabricated wood parts, fire extinguishers, chemicals, and precision instruments.

Other money from the Bell System goes into American communities

in the form of dividends paid on stock of the American Telephone and Telegraph Company. There are 975,000 owners of this stock, and they live in cities, towns, and rural areas throughout the country. These investors come from all walks of life. They include farmers, business men, clerks, mechanics, clergymen, merchants, teachers, housewives, doctors, lawyers, civil service workers, people who have retired, widows—hometown folks and neighbors everywhere.

At least one in every fifty families has invested savings in A. T. & T. Many more have a beneficial interest through the holdings of insurance companies, schools, churches, hospitals, and charitable institutions.

HERE IS HOW Bell System disbursements are made in some representative communities:

Last year in Pawtucket, Rhode Island, the Western Electric Company made purchases totaling over $593,000 from 14 suppliers. These included such diverse products as webbing, wire, bolts, plastics, venetian-blind ladder tape, and cotton waste.

In addition to this sum, major expenses of the New England Telephone and Telegraph Company for payroll, taxes on property, and garage rental amounted to about $1,014,000. And there was an additional amount of roughly $120,000 in the form of dividends paid to Pawtucket owners of A. T. & T. stock.

For these purposes, then, Bell System Companies disbursed a total of more than $1,727,000 during 1949 in the city of Pawtucket, or an average of about $4.42 a month for each telephone in service there—a significant amount of money added to the economy of this one community.

Another representative community is Aurora, Illinois, where Bell System companies paid out more than $1,238,300 in 1949—an average of about $4.50 a month per telephone. The pattern was the same as in Pawtucket. Western spent $324,300 for purchases of a wide variety of articles from 15 different suppliers; the Illinois Bell Telephone Company paid out $861,000 in wages and other expenses, and A. T. & T. paid approximately $53,000 in dividends.

In some communities, the System pays out more money than it takes in. In Appleton, Wisconsin, for example, Western's purchases, disbursements of the Wisconsin Telephone Company, and dividends totaled over $1,912,000 last year, an average of about $10 a month per telephone, while $981,027 was received in revenues.

THERE ARE NATURALLY many other miscellaneous expenditures that mean money for local businesses. As an example, Bell Companies spent over $10,000,000 in 1949 alone for tree trimming to prevent interference with telephone lines.

In addition, there are non-recurring construction expenses. From the end of the war through 1949, more than 3,800 buildings and building additions were constructed for Bell System companies at a total cost of $412,000,000. This, plus about $22,000,000 spent on alterations and repairs to existing buildings, added up to a lot of business for architects, real estate men, surveyors, contractors, suppliers of materials, and

building craftsmen in all trades, right across the country.

Bell System taxes—and what they mean in the support of schools, fire and police departments, and other such public needs and governmental operations—constitute a sizable contribution to the American community. Local, State, and Federal taxes paid by the Bell Telephone Companies in 1949 totaled over $346,000,000. In the final analysis, of course, it was the telephone customer who paid this. He also paid Federal excise taxes amounting to about $445,000,000, collected for the Government by the Bell Companies.

Thus, taxes on Bell System telephone service in 1949 totaled nearly $800,000,000, equal to more than $2 a month for every telephone in service.

Stable Employment

COMMUNITIES where Bell Companies operate benefit, too, from the fact that Bell System employment is good employment. Telephone people receive good wages; they are covered by benefit and pension plans which tide them over in times of sickness and accident and provide for their retirement years. Here are some of the things these plans give to employees:

Sickness benefits—up to a year's full pay, depending on length of service, to those unable to work because of sickness.

Death benefits—up to a year's full pay, depending on length of service, to dependents.

Pensions—every employee with 20 or more years of service can look forward to a pension of at least $100 a month at age 65, including Social Security. Many employees will get substantially more. For instance, a plant craftsman, now age 40, with ten years' service and a basic wage of $80 a week, can expect to retire at age 65, with 35 years' service, on a pension of $161.80 a month, including Social Security, based on his present wage and the existing Social Security law.

These things, plus the fact that telephone service is an essential, year-in-and-year-out business, mean stable and secure employment with a minimum of turnover. During the past five years, monthly turnover in the telephone industry averaged only 2.4 out of every 100 employees, compared to 5.6 per 100 in all manufacturing industries.

Telephone employment thus represents a factor of stability in the economy of the community; it contributes to the security of other businesses there.

Public Telephones

THERE ARE over 330,000 Bell System public telephones in service throughout the country, located in such places as cigar stores, restaurants, grocery stores, railroad stations, hotels, drug stores, and department stores. These businesses receive commission payments from Bell Companies for services performed in connection with the use made of public telephones installed on their premises. In addition, hotels are paid commissions on toll calls made from telephones in guest rooms. Nearly $30,000,000 was paid in com-

missions on public and hotel guest usage during 1949.

Beyond these commissions, public telephones help create business. A recent survey showed that one out of every five persons who went in drug, cigar, and stationery stores to use public telephones made purchases while in the stores, and that one out of six companions who waited while the calls were made also bought something.

Independent Telephone Companies

FOUR-FIFTHS of the telephones in America are served by the Bell System. The rest are owned and operated by about 5,600 other telephone companies and by additional thousands of rural or farmer lines outside of the Bell System but connecting with it. Like the Bell Companies, these independent companies make important contributions to the communities in which they operate.

In addition to furnishing local telephone service, the independent companies perform the outstanding service of helping to make communications nation-wide. Their lines tie in with Bell lines to form the vast network which enables a telephone customer in any part of the country to call any other and to reach nearly 96 percent of the world's telephones. More than half a billion toll calls were handled by means of this arrangement in 1949.

The working together of Bell and non-Bell companies in this manner offers a fine example of coöperation between large and small businesses.

ALL THESE THINGS add up to an outstanding example of how business operates in America. They show how the success of one business contributes to the success of others.

Money taken in, in return for telephone service, goes back into the community in the form of telephone wages, expenditures for supplies, taxes, dividends, and service improvements. It is a continuing process, stimulating other businesses and making an important contribution to the over-all prosperity of communities throughout the country.

NOTE: This article also appears in *Public Utilities Fortnightly* for September 28. EDITOR.

School-to-Home Service, Involving Classroom Unit, School Amplifier, and Home Station, Brings Both Instruction and Companionship to "Shut-In" Youngsters

The Magic Box That Opens The Door to Education

Harold G. Weissenberger

ALL FAIRY TALES BEGIN with "once upon a time," and this one is no exception—although it is a fairy tale come true.

Once upon a time, then, when a youngster was unable to attend school because of physical limitations, it meant either no further schooling, or education only by a visiting teacher. These youngsters, confined to their homes, generally known as "shut-ins" or "home bound," might also be defined as "shut-outs," for they are generally shut out from society and a normal life. They have few friends, and spend day after day patiently trying to occupy their time between the relatively short visit of the bedside teacher and any other forms of amusement or occupation which might make the hours of the day pass more rapidly for them.

Now, with the offering of school-to-home service by the Bell System, many of these unfortunates have once again become part of a class, even though it be several miles away. The use of this service allows youngsters who had attended school at one time to "return," and those who have never been inside a school to "attend" for the first time. It brings them together with students their own age, even though only by voice, and creates a bond with society. It virtually opens the door to education—opens a door that had been previously closed. Their voices are the magic "Open Sesame" of the Arabian Nights, opening the door which contains the treasures of a more complete education. The voices of the teacher and of youngsters their own age bring the classroom into their homes. The transmission of their voices to the classroom through the magic box makes them a part of the class, just as if they were sitting in a seat beside other children. The opening of that door leads to riches

which yesterday were not within their reach. These riches go beyond education, for they also bring companionship and an interest in life which without the magic of communications would not have been possible.

WHAT IS this school-to-home service, which opens such vast domains for the shut-in? How did it come about, and how does it work? What arrangements must be made for its installation? What does it mean to the handicapped, and how does it affect existing home instruction programs?

A considerable amount of work and experiment was necessary before the service was ready for use. The Bell Telephone Laboratories had undertaken before World War II the development of equipment for the service, and in the early stages of the war coöperated with several Bell System companies in the installation of specially assembled equipment. These trial installations indicated that the service could be provided, and that it was acceptable to educational authorities as a means for instructing the home-bound.

After the interval of the war, the Laboratories coöperated with Executone Incorporated, of New York, manufacturers of electronic communication systems, in adapting the design of their equipment for this type of service. The equipment, which uses patents owned and licensed by the American Telephone and Telegraph Company and the Western Electric Company, was modified to meet Bell System standards, and was tested by the Laboratories to assure that it could be used with telephone facilities. It is this equipment that is being used to furnish the service, making Executone another one of the more than 24,000 manufacturers who are supplying equipment or parts to the Bell System.

Basic Equipment

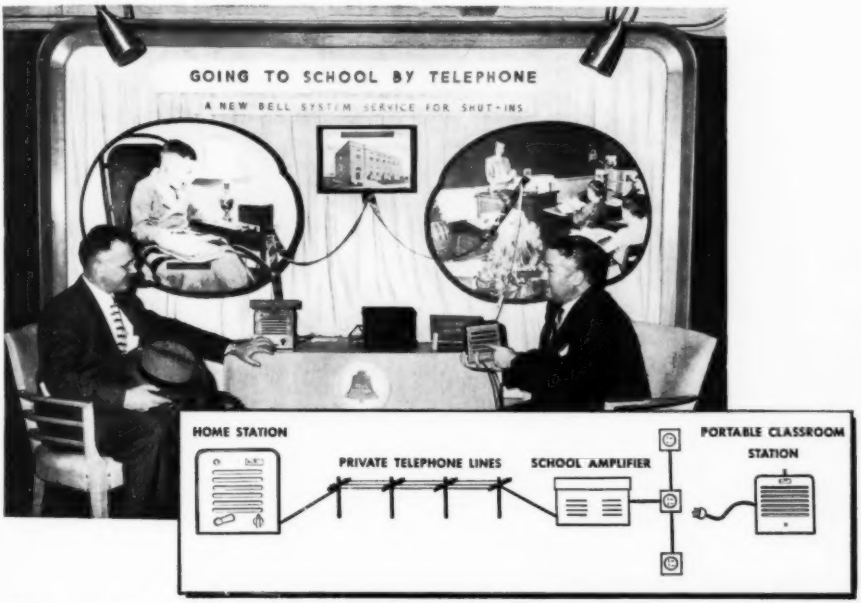
SCHOOL-TO-HOME service is basically a two-way speaker-microphone arrangement between the classroom and the home of the handicapped student. There are several arrangements of the equipment which are used; fundamentally, however, the operation of each is the same. All systems normally consist of three components: the portable classroom unit, the school amplifier, and the student's home station.

Usually the classroom unit is located in the vicinity of the teacher's desk, about five or six feet from the floor, with the face of the equipment toward the students. A wooden stand provided by the school, and perhaps made by one of the woodworking classes, has generally proven very satisfactory for the purpose. The unit, which weighs about five pounds, is rather small, being only about 7 inches wide, 7 inches high, and 4 inches deep, and is housed in a metal cabinet with a bronze metallic finish. It can be conveniently carried from classroom to classroom. This unit is connected to the school amplifier by wire, and does not require connection to a source of power in the classroom.

The school amplifier is contained in a brown wrinkle-finish metal box 7½ inches high, 9 inches wide, and 6½ inches deep, and weighs about 12 pounds. It can be mounted on a wall or shelf, and is usually located in a

room with other school equipment, such as the custodian's room, the clerk's room, or some other practical location where it is easily accessible to the school people—since this unit has a switch which must be turned on in the morning and turned off at the end of the school day. This unit requires connection to a commercial power outlet, and affords the link and control between the classroom and the home station. It is connected to the telephone line in much the same manner as is a regular telephone. It operates over the same type of telephone wires that normally provide individual-line exchange telephone service, going through the central office or offices and finally to the home of the shut-in, where it is connected to the home station. The school-to-home service cannot be provided, unfortunately, in those areas where only party-line or rural-line service is available, since a private line is needed which is separate and distinct from the regular exchange service.

The home station, the magic box of the shut-in, which is now in use is about the size of a portable radio, and weighs about four pounds. A new unit, about the size of a small adding machine, will soon be made available, and will have a metal casing, similar to that of the classroom unit and weigh about 15 pounds. It should be located, whenever possible, on a desk, table, or shelf within arm's length of the student, so that he can easily reach the controls which ope-



This is how the Bell System's School-to-Home service was exhibited to educators at the thirty-seventh annual "Schoolmen's Week" held at the University of Pennsylvania in Philadelphia last Spring. The lower diagram shows the elements through which the service operates

rate the equipment. The student makes the unit operative by turning on the power switch and adjusting the volume to the proper loudness, in the same way that a radio is adjusted for volume. Since the home station requires commercial power, there must be a wall outlet nearby.

Using the Magic Box

ONCE THE equipment is connected and turned on, the system normally picks up the classroom activity: the words of the teacher, the recitations of other students, the rustle of paper, and even the squeak of chalk on the blackboard. These sounds are received by the microphone of the classroom unit and are transmitted through the school amplifier to the private-line telephone channel, at a volume low enough to prevent interference with other telephone lines in the same cable. The sounds are then received and amplified at the home station, the amount of amplification depending on the adjustment of the volume control by the student. The amount of amplification is limited so that intelligible crosstalk (voices from other pairs of wires in the same cable) cannot be heard by the student when the volume control is turned to its top position.

When the teacher calls upon the shut-in to recite, or to answer a question, the latter changes the direction of transmission by pressing and holding the control switch to the *talk* position. This changes the home station from a speaker to a microphone and at the same time sends a signal over the telephone line which changes the classroom unit from microphone to speaker and conditions the school amplifier to amplify the student's voice through the classroom speaker. After reciting, the shut-in student releases the control switch on his home station and the service is automatically restored to its normal operation.

A member of the school staff turns on the amplifier at the beginning of the school day. In his hand is the classroom station

Another feature of

the service is that several shut-in students with their own individual home stations may attend the same class through the single classroom unit. This kind of service is somewhat similar to a telephone party line, since the shut-in students can hear one another as well as the teacher and the recitations from the classroom. However, if two students should press their control switches to the *talk* position at the same time, they would not be able to hear each other, because both would then have their microphones connected to the telephone line.

It is considered a special honor to be the pupil selected to carry the portable classroom station from class to class

It is interesting that, in most instances, where several students are connected to the same line, they talk to one another, compare notes and discuss lessons, even though the school equipment may be turned off, and thus gain an added companionship during the out-of-school hours and days. This is possible because each student's home station contains its own amplifier and the means whereby it may be changed from speaker to microphone.

As in all systems which use speaker-microphone equipment to pick up voices from a few feet away from the microphone up to 20 or more feet, as in a classroom, no one system can satisfactorily meet all the situations likely to be encountered. It is not to be expected, therefore, that remarks from all students in the classroom under all conditions will be picked up by the microphone and become audible to the shut-in. In those cases where there is some limitation to its use, it may be necessary for students who are farthest from the microphone to step up closer when they are called upon to recite, so that the shut-in can hear them.

Making Arrangements

TO THE customer, it may seem that, once the service is ordered, all that must be done is to obtain the equipment, connect it, and—as in any fairy

tale—it is in operating order. There is still more work and planning, however, which must be done before the service is in operation, not only in making the actual installation but also in negotiating with the customer. Let us take a look, then, at some of the things which must be attended to before service is in operation in the home of the shut-in.

In general, there are a number of people whom it is desirable for the telephone representative to meet, in order to discuss the service and obtain information so that all parties involved have an understanding of the equipment, its advantages and limitations, and the problems that are most likely to arise. This is particularly true when it is the first installation for a school.

These people generally include members of the board of education and the supervising principal, the school principal, the class teacher, the bedside teacher, and the parents.

In discussing the service with them, it must be made clear that it can not be used by every handicapped youngster, and that it is not a panacea in the education of the shut-in.

Age must be considered. There are a few installations where the service is in use below the fourth grade, it is true; but in general it is most effective above this grade. This is primarily because of the large part that the visual senses play in education before the fourth grade, thus limiting the amount of knowledge which can be absorbed solely through the use of the auditory senses.

Another point for discussion is the need to review teaching techniques to be sure that the confined student does not get "lost" when the work involves visual presentation or other work not readily followed. This has been done so far without sacrificing too greatly the normal classroom procedure, but much work still remains to be done here as more experience is gained with the service. It would be not unreasonable to expect that the universities and teachers' colleges might include in their curricula, at some time in the not distant future, the use of this service and the techniques it requires.

Transmission and Reproduction

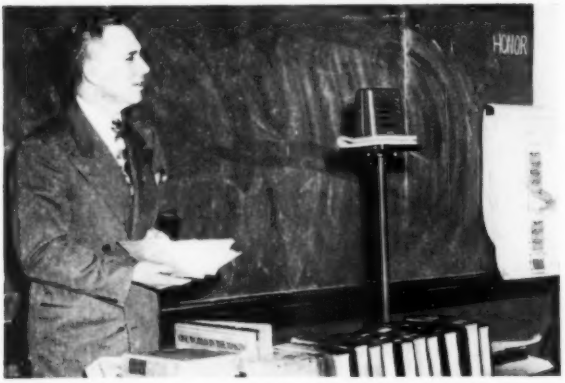
THE QUALITY of reproduction of the voice by the equipment must be explained, so that educators do not expect reception of radio broadcast quality from the equipment, which, after all, is designed only to give a good grade of service at a reasonable cost. The equipment, since it is not highly directional, picks up background noises from the classroom. These vary in intensity, depending on the size of the room, room acoustics, and other factors such as the type of schoolroom equipment, the number of children, their age, and the means of instruction. These sounds and noises appear to be greatly amplified when heard by the shut-in. Concentration by the student, and continued use, tend to minimize their interference, however, and they generally have little or no effect on the intelligibility of the words he hears and speaks.

The transmission of voices of small children offers another challenge to the use of the service. Their thin voices do not carry as well as the resonant tones of older students. However, somewhat the same condi-

tions are present in the classroom itself, and usually the shut-in adjusts very readily and misses very little of the classroom work. Oftentimes a demonstration of the service by a telephone company representative helps immeasurably in bringing about an understanding of the capabilities of the service.

The representative of the telephone company and the school authorities usually visit the home of the shut-in to obtain the approval of the parents for the use of the service and to discuss its installation and operation. Many of the schools also survey the home at the same time, to make sure that the student will have suitable working arrangements and that there will be as little distraction as possible from other members of the household, radios, television sets, pets, and the like. These might be disturbing to the student and, moreover, result in the transmission of objectionable sounds to the classroom through the student's home station. It is also desirable to suggest that the parents consult their doctor to be sure that the youngster is physically and mentally able to become a "member of the class." Quite often students are only permitted to "attend" school on a part-time basis because

School-to-Home service almost transports this grammar-school youngster into the presence of his classmates



This stimulating instructor makes his classes seem real to the high-school boy shown on the opposite page

their doctors have felt that a complete program would be detrimental to their health.

After the planning has been completed and the service is in operation, it has been the general experience that it takes about two weeks for the teacher, the shut-in, and the class to accustom themselves to the use of the service. After this period, the novelty and the consciousness of the existence of the equipment no longer are a factor, all parties become relaxed, and class work continues almost as normallly as if the shut-in were present in the class.

What the Service Means to the Handicapped

NOW LET'S TAKE a look at what it means to the handicapped when the door to education has been opened as if by magic words and the student is inside. What are the treasures he finds hidden that makes opening the door worth while? The only way to answer this, of course, is to get an appreciation of what the service has done and is doing for those who have used and are using it.

In an article in the October 1949 issue of *The Crippled Child*, official publication of the National Society for Crippled Children and Adults, Inc., Mr. W. A. WinterStein, Director of Special Education in the State of Iowa, one of the pioneers in providing this service and the man who has perhaps had more experience with it than any one in the country today, stated:

"Life will be different this year—at least for some of those children who are unable to attend school because of handicaps resulting from cerebral palsy, polio, arthritis, tuberculosis, or cardiac disorders, or from a disabling accident. At last, a way has been found to provide the handicapped child with some of the things he needs and misses the most—the opportunity to obtain a full education and participate in school work in almost normal fashion—the sense of belonging—the stimulus of social contact with his own age group—the pride of achievement.

"The mental and spiritual stimulation that instills the will to live and fight, and contributes so much to eventual recovery, is enhanced by the electronic school-to-home system which brings the shut-in child's classroom right to his bedside."

"Life is different" for those youngsters who are provided with the service. The words and laughter of

fellow students are like magic to those who have never heard them before or who have been away from them for a long time. The girls and boys in the schoolroom quickly accept each unseen companion as one of them. They do not remain unseen for long, either, for curiosity concerning who is at the other end of the line soon prompts visits to the shut-in's home.

Recovering from polio, this lad keeps up with his studies while he awaits recovery to return to school

In a number of instances, the service has been provided to shut-in youngsters who have been regularly left alone, day after day, because both parents have had to be away at work. Even though they can get around enough to take care of their needs, even though a visiting teacher brings instruction several times a week, loneliness and boredom have been their steady diet. To such youngsters, the door opened by the magic box has made available a priceless treasure, and hours go by like minutes and days like hours. And they dread holidays and vacations as much as non-handicapped children look forward to them, for then their contacts with the outside world disappear, and they count the days until school opens once again.

Then there is another group to whom the school-to-home service is a boon and blessing: the temporarily handicapped, those who have suffered from some accident or sickness from which they will recover. Within six months, a year, two years, they will be back again with their schoolmates.

What does this service mean to these youngsters?

Without the service, a bond is broken. Schoolmates lose sight of Jimmy or Joan. In some cases, where home teaching is not provided, education stops. With the service, there is practically no interruption. They continue with their regular classwork, they hear familiar voices and remain a part of their classes, and they are not forgotten. When they return, it is almost as if they had never left. They continue with their own age group and take their place once again at a desk in the classroom.

These are but a few examples of what the service means to the handicapped. The advantages of "belonging" and being an active member of the class would justify its provision, even if little educational benefit were derived. Yet as an educational medium, the reports so far indicate, it has been extremely successful. In Iowa alone, approximately 1,000 children have received all or part of their education since this service was first adopted. Numerous cases are

reported of students who, using the service, have led their classes in scholarship. Several have been valedictorians. When the disadvantages under which these students work are considered, this is a valid recommendation for it as an educational medium. These results seem to indicate that it may become a common and accepted form of instruction for shut-ins in the future.

Proof Positive

IN telling this fairy tale, we have generalized so far. A review of some actual cases might indicate how valuable the students found the opening of the door to education to them:

OUT IN WISCONSIN, just before Christmas in 1941, they picked Frank Huettner, Jr., out of an overturned bus on an icy road, and predicted he would never live. Frank had the will to live, and nearly a year and a half later, confined to a wheelchair, he began studying at home with the assistance of some of his teachers. He made up the 15 months that he had lost and was graduated in 1944. But how could he get his college education? Frank was anxious to attend teachers' college in Eau Claire. He heard of the experiments with the school-to-home service which were being undertaken at that time, and persuaded the college to permit the innovation. The Wisconsin Telephone Company provided a special assembly of equipment which in its operation resembles the equipment that is being offered today. For two years, Frank attended the college remotely and made straight A's during that time. In 1946, he transferred to the University of Wisconsin, taking his magic box with him, to study law. Frank's only surprise about all this is that any one should be surprised at the ability to get an education despite a handicap.

ROY MILES, of Merrick, N. Y., was a twelve-year old, whom rheumatic fever had forced to give up an active life in the early part of 1949 for one of lying in bed for months. Staying in bed, seeing very few friends, visited by his teacher only twice a week—Roy's spirits were mighty low. He thought he was the forgotten boy. Then the service was installed. Once again he was talking with friends whom he had neither seen nor heard for over three months. Roy recognized without fail almost every voice that came over his loudspeaker. With the service, Roy's marks improved, and his principal remarked that they were even better than when he attended school in person. His teacher also mentioned that "During my two visits a week, school work was difficult for Roy. He had everything at once. Now he can follow us in the class, and what he misses can be supplied when I visit him at home." Roy thinks the service is "swell."

THE LAST STORY is about two youngsters in the same family, in East Baton Rouge, Louisiana. Fleming and Muriel Roe, a brother and sister, have been crippled since early childhood with osteomalacia (commonly called soft bones). Their parents heard of the school-to-home service, and requested the Southern Bell Telephone and Telegraph Company to furnish it. The service could not be provided by Southern Bell, because the home of the Roes was not in its territory. But that did not end the matter. It was recognized that the provision of the service called for ingenuity, coöperation, and work, so that these youngsters might for the first time "attend" school. On their own time, Southern Bell people in the various departments checked into the situation. The route was surveyed, and it was found that the school was about two miles from the home. The line layout was made and the costs were estimated. As the word spread through the "grapevine," others in the town offered assistance in the form of material, labor, and whatever other help was needed.

XUM

After the plans were made and the equipment obtained, 20 telephone workers, along with others in the town, contributed their day off and strung wires across poles already dug in by the children's father and other residents. By the following Monday, the children were "in school," members of the class for the first time. Are these youngsters enthusiastic about "going back to school"? This question does not have to be answered.

Home Instruction Programs

ONE QUESTION which frequently arises in connection with furnishing this service deserves a great deal of consideration. That is the effect of its use on home instruction programs. In furnishing the service, the Bell System does not contemplate that its use by schools should replace home instructors. Rather, it might be considered to be supplemental and a means for extending the scope of usefulness of home instructors, since fewer or shorter visits are necessary. In this way, they can serve more students or spend more time with those for whom the wire service is not applicable.

Writing on this subject, Mr. Lawrence J. Link, Executive Director of the National Society of Crippled Children and Adults, Inc., referred recently to a report, "Opportunities for the Preparation of Teachers of Exceptional Children," made jointly by the Society and the United States Office of Education, in which it was stated that "there are only about 20,000 special teachers in the country today who are qualified to work with handicapped children. More than 80,000 are needed to meet the needs of the nation's handicapped children. As a result, many thousands of children are being denied educational opportunities."

Mr. Harry D. Hicker, Chairman of the Commission for Special Education in Los Angeles, California, also recognized this problem, and in an article published in *California Schools* said that "the home instructor can spend as a maximum five hours per week with each student and as an average much less. Between visits there is either listlessness or uninspired self-study." In considering the use of the school-to-home service, he continued, "There are, of course, limitations in the use of the service. For instance, the plan would probably not be effective for a child not sufficiently mature mentally to visualize classroom procedure and to interpret instruction and discussion as heard over the teaching device."

This reiterates the facts brought out in the United States Office of Education report of the lack of sufficient teachers, as well as the fact that this service cannot be used in all situations. The reduction in visiting time to school-to-home service students will permit visiting teachers to give more time to children who cannot use the service and, in many cases, to instruct, for the first time, those children who have been unable to obtain such instruction because of the shortage of visiting teachers.

In the light of these two articles and the experience with the service so far, it might well be concluded that there is no danger of the service replacing or reducing any well-established program which may already be in use. Indeed, the availability of the service might even point out the need in many communities for a more extensive program of care for those

A Telephone Company representative shows a homebound youngster how easy it is to operate the "magic box" which links him directly with studies and happy voices

whom we very often lose sight of, so that they may enjoy the same privileges as their more fortunate members in society.

Working with Educators

IN PROVIDING this service, the telephone companies of the Bell System are working with the boards of education, principals, and other school authorities in their communities to acquaint them with the service and to assist them in every way where there may be a need for this service.

Several of the Associated Companies have demonstrated and exhibited the service, by invitation, at conventions and meetings of large groups of people. These demonstrations were made not only to those whose interests are primarily in the educational field but also to organizations who are interested in the welfare and achievements of the physically disabled. An outstanding example of this is the demonstration and exhibit in November 1949 at the annual convention held in New York of the National Society for Crippled Children and Adults. As a special feature of the program, a crippled girl in a wheelchair on the stage of the auditorium took full part in a classroom discussion several miles away. This demonstration was given much publicity throughout the United States, and the school-to-home service received the endorsement of the Society as one of the projects which it plans to make available to children in states where educational programs for handicapped children have not developed because of lack of funds.

Not only has this service received widespread publicity in the United States, but radio listeners overseas have also heard the story of how communities in this country have not neglected the education of the shut-in. The "Voice of America" late last spring "attended" school with recording equipment and made transcrip-

tions in both the classroom and the home of a shut-in. As the recordings were being made, classroom procedure was interrupted from time to time for explanation of what was happening. These explanations were translated into Austrian, French, English, Portuguese, and Italian, and broadcasts of the recordings were later "beamed" to listeners overseas to give them an idea "of the soul and heart that is America."

A motion picture is now under preparation by the Bell System which, in addition to showing other operations of the Bell System, will also show the operation and use of school-to-home service. This picture, called Screen Review No. 10, is being released this Fall, and will be shown in local theatres throughout the country, and also by the telephone companies to local groups who have an interest in this service.

AS THE 1950–51 school year progresses, and as the public and educational authorities become aware of the usefulness of this service, it is expected that more and more children who have not been able to attend school will be depending on this service to bring them into the classroom once again. And as each new service is installed, this classroom fairy tale of the magic box that opens the door to education will be told over and over again.

OCTOBER MARKED a half century of serving the nation's long distance communications needs by the Long Lines Department of the American Telephone and Telegraph Company. Starting in 1900 with a few open wire lines which connected the principal cities of the east and midwest, Long Lines now operates over 20 million miles of circuits tying in with the facilities of 21 other Bell System companies and some 5,600 independent telephone companies to interconnect more than 40 million telephones throughout the United States. Fourteen million of the Department's 20 million miles of circuits are needed to handle a daily average of 850,000 long distance telephone messages. The other millions of miles of circuits are devoted to a variety of long distance services, including special private line telephone and teletypewriter, teletypewriter exchange service, telephotograph, and radio and television networks. The Long Distance Lines Department, as it was called until 1917, was set up by the A. T. and T. Company as a separate department with its own operating staff when it became apparent, at the turn of the century, that providing long distance circuits to interconnect local telephone companies was to be a large scale job. It now has about 23,000 employees in 366 communities in 40 states and the District of Columbia.

Western Electric Makes Equipment for Transmission of the Spoken Word; Teletype, Its Subsidiary, Makes Equipment For Transmission of the Written Word

Teletype's Share in Bell System Operations

Philip H. Miele

This is the seventh of a series of articles describing the Western Electric Company and its place in the Bell System organization. EDITOR

WORKING SIDE BY SIDE with Western Electric products in the Bell System's communication network, the Teletype Corporation's products keep almost 4,000,000 miles of circuits busy carrying TWX and private-wire messages. The extent to which industry is relying on teletypewriter communication for its day-to-day business dealings is revealed by the fact that Bell System subscribers to teletypewriter service are now using 55,000 printer stations.

Teletype equipment is manufactured by the Teletype Corporation, a subsidiary of Western Electric. Neighbor to Western Electric's great Hawthorne Works in Chicago, Teletype's plant employs some 1,800 persons, manufactures about 30,000 different parts for assembly in various items of printing telegraph apparatus which are used by a wide range of customers—the Bell System; other communications companies; Federal, state and local governments; transportation companies; and manufacturers, distributors, press services, brokerage houses and scores of others.

Extensive Line of Products

LET US very briefly examine how Teletype equipment works.

The simplest arrangement consists of two "Model 15" page printers connected by an electrical circuit. They both look like typewriters, having a keyboard and a set of type bars that print through an inked ribbon onto paper. When an operator types out a message, the message is printed on the paper of his own instrument and at the same time is printed on the paper of the other instrument. The operator at this other instrument can convert his printer from a receiver to a sender, then type out an answer.

Now, to introduce two more of

Teletype's products, let's add a tape perforator and a transmitter-distributor to the Model 15 printer—and we have the Model 19 set. This set may be used for direct sending, as described above, or for preparing perforated tape for automatic transmission. The tape consists of a strip of tough paper 11/16 of an inch wide on which the message is recorded in the form of many small holes or perforations. This tape can be fed through the transmitter-distributor, which will send the message automatically at maximum speed over the wire to a teletypewriter or to still another unit of apparatus, the reperforator.

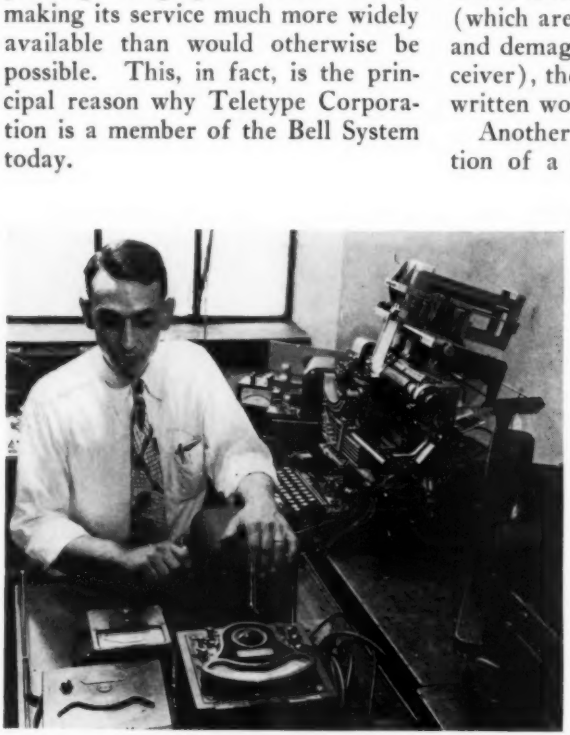
The reperforator, as the name implies, reproduces the incoming message by punching it on another tape at an intermediate station for relay to its destination. Some types of reperforator also print the message on this tape, so that it may easily be read. From the relay station's point of view, the advantage of perforated tape (in addition to speedier transmission) is that the attendant can relay the message automatically and busy himself with other things while it is being transmitted.

If we add several printers to the same circuit, another important product of the Teletype Corporation may be introduced: the sequential selector, which permits automatic routing of a message to one or several of the printers on the circuit. Before beginning the message, the operator types out a code "informing" the sequential selector which printers he wants to send to. The selector then automatically turns these machines on, leaving the others temporarily off the circuit.

These are only a few of the basic items manufactured by the Teletype Corporation. There are many others, some of which combine in single sets different arrangements of the units already described, and others which perform entirely different functions in the field of automatic switching and multiplexing of circuits. Numerous accessories and attachments which make possible special applications of the products already described—a complete line of metal tables, consoles, and apparatus cabinets, designed specifically for printing telegraph use; parts of Automatic Message Accounting equipment; and Teletypesetter apparatus—round out the line of Teletype products.

A Model 19 printer. It is basically a Model 15 machine with perforator transmitter keyboard plus—to the left—a transmitter-distributor, which transmits the message from the punched tape, and—beneath the table—the tape reperforator, which records incoming messages by punching tape

There are many advantages of Teletype equipment as a medium of communication. One is that the written message is more permanent than the memory of a spoken message. Another is speed: with Teletype, you can send a written message across the nation or across the street in less time than it would normally take to type, address, and post a letter. One of the most engaging advantages of Teletype, however, is that it can be used on already existing telephone circuits (by converting them into 18 printing telegraph circuits each), making its service much more widely available than would otherwise be possible. This, in fact, is the principal reason why Teletype Corporation is a member of the Bell System today.



In the Teletype Corporation's research development department, a development engineer checks the performance of an Automatic Message Accounting ticket printer—manufactured by Teletype for Western Electric

History of Printing Telegraphy

THE HISTORY of printing telegraph is an interesting one. In 1824, Sturgeon of England learned that if an iron bar were surrounded by insulated wire, the bar would become magnetized as electricity was passed through the wires, and demagnetized when the current stopped. This discovery paved the way for Morse, whose telegraph system and the code which bears his name are still in wide use today. With the Morse telegraph system, the person who receives listens to a series of dot-dashes (which are the result of magnetizing and demagnetizing of part of the receiver), then translates these into the written word.

Another step came with the invention of a machine to "listen" to a code and automatically translate this code into writing—which is what Teletype does today. The first practical application of printing telegraph is generally credited to R. E. House, who in 1849 set up a workable circuit between New York City and Philadelphia. Numerous improvements and refinements followed, including the Hughes Printing Telegraph, which was introduced about ten years later. Another outstanding contribution was made by Jean Maurice Emile Baudot, an officer of the French Telegraph

Service, who in 1875–1877 developed a new system based on an entirely different code. The Baudot machine reads a code consisting of impulses of equal length, instead of short "dots" and long "dashes"—a simpler and speedier arrangement which is now widely employed in the printing telegraph field.

With this code, the time it takes for one letter or character to be sent and received is divided into five periods. The circuit can be either open or closed during each of these five time-periods. Each of the alphabet's letters requires a different sequence in which the circuit must be open and closed; the receiving machine reads the sequence and translates it back into whichever letter was sent. (Today's Teletype apparatus normally does this at a rate of from 60 to 75 words a minute.)

Baudot's code requires that the receiving machine be synchronized with the sending machine. Following his invention, a great deal of developmental work was undertaken to provide simpler and more dependable synchronizing methods. The Morkrum Company, early predecessor of Teletype Corporation, produced a solution in the form of a start-stop method of synchronizing which, with refinements, is still in use today. This company was started in 1906 by Charles Krum, who provided the technical "know-how," and Joy Morton, founder of the Morton Salt Company ("when it rains it pours") who backed the enterprise financially. Sons of these two men, Howard L. Krum and Sterling Morton, took over the active management of the company about a decade later. This company manufactured the machines which were used first by the Postal Telegraph in 1910, then by Western Union in 1911, and (revolutionizing newspaper business) by the Associated Press in 1915.

Meanwhile, the Kleinschmidt Electric Company in Long Island was also manufacturing telegraph printers. Both companies engaged in spirited competition for a market, which then consisted of only a handful of customers—some railroads, press services, and the Postal and Western Union

In the drawing-board stage of Teletype's design department are piece-parts which will take their place in new and better equipment for transmission of the written word

Telegraph Companies. Mainly for economic reasons, the two companies merged in 1925, forming the Morkrum-Kleinschmidt Corporation, with the Morkrum plant in Chicago as headquarters. A few years later, the name of one of its products was adopted as the firm's name and the Morkrum-Kleinschmidt Corporation became the Teletype Corporation.

Bell System Affiliation Broadened Services

TELETYPEWRITER EQUIPMENT can work on telephone circuits—as was mentioned earlier. The Bell System, in the early days, leased wires to numerous subscribers who used them for teletypewriter communication. The demand for this service was growing and the Bell System became Teletype's major customer. But even with this growing demand, the use of Teletype's equipment was restricted to those few large companies with communications needs sufficiently large to warrant their owning circuits or leasing them.

It was apparent at that time, first, that teletypewriter service was no longer incidental to the telephone business, but was destined to become an important adjunct to it; and, second, that if Teletype communications were to be made generally available to smaller business firms and individual users at lower cost, basic developments were necessary. It was felt, therefore, that if the Teletype Corporation were part of the Bell System, the printing-telegraph-using public would benefit just as the telephone-using public benefits from Western Electric being part of the System, because in that way the three essentials of service—research, supply, and operation—would be coordinated to produce better service.

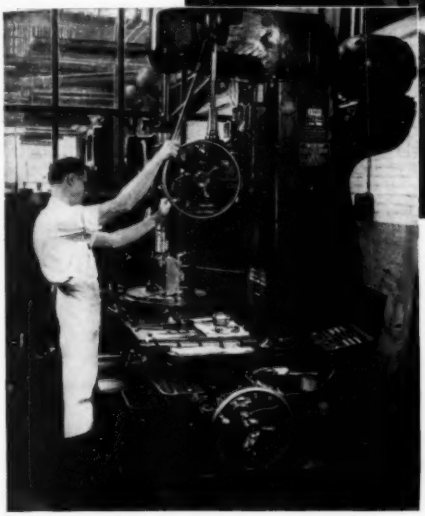
Teletype Corporation became a full member of the Bell System in 1930, as a Western Electric subsidiary, and less than a year later a new development took place that was as important, in its way, as was the invention of Baudot more than a half century earlier. A switchboard for teletypewriters was developed, and in 1932 the Bell System announced a new service to the public: Teletypewriter Exchange Service (TWX), which used telephone circuits to provide nationwide printing telegraph communication. The switchboard permitted any TWX set in the Bell System throughout the country to be connected with any other, just as any telephone can be connected with another.

TWX Provides Nationwide Communications

THIS TWX SYSTEM put Teletype service within the reach of the thousands of smaller business customers whose need for speedy written communications did not warrant the expense of building their own circuits, or of leasing them on a part- or full-time basis. With the introduction of TWX, they were able to subscribe to this service just as most of us subscribe to telephone service, paying only for the length of time the line is used and the distance between the calling and the called parties.

This service not only made more firm the connection between Teletype equipment and the telephone network, but also opened up a vast new field for further development, with

Delicate saws and files (right) and towering jig borers are all part of the job of making the tools with which to make Teletype equipment



the result that printers can now be used over other kinds of circuits, such as microwave radio relay, mobile radio, and coaxial cable; and—also in parallel with the telephone industry—printed messages can be routed by automatic switching equipment.

Continuous Development Program

TODAY, development work is one of Teletype's major undertakings, closely integrated with its manufacturing activities. In its main building in Chicago are extensive laboratories for basic research, still others for developing and testing new products, and a complete model shop which is almost a miniature manufacturing plant itself. In fact, so important is development work that one out of every 20 employees is directly engaged in some aspect of product improvement. These employees are now working on a new line of printed communications equipment which will be fundamentally different from present Teletype products. In general, the goals of Teletype's research team are to increase speed of operation; to cut maintenance costs; to increase the flexibility of application; to reduce size, weight and noise; and to improve appearance.

All of these aims must be pursued within a framework of numerous invariables. A new printer, for instance, must be able to work side-by-side with equipment of earlier design that is already in use, and some specialized equipment must meet very rigid operating requirements such as would be found, for example, in an airplane installation.

Although Teletype, unlike other Bell System companies, looks to its own facilities for research and development, it nevertheless maintains an intimate working relationship with the Bell Telephone Laboratories. The Laboratories design the networks on which Teletype equipment is used in the Bell System, specify traffic and operating requirements, and translate Bell System needs into research and development projects to be undertaken by Teletype's staff. In short, it is a customer's specific need that is the mother of invention at Teletype.

DURING World War II, when the Government was the Company's principal customer, more than 100 major development projects were carried to completion. Right after the war, an interesting one was undertaken for the Civil Aeronautics Administration, which employed 600 weathermen in widely scattered stations. These men typed hourly weather reports to a central headquarters, each waiting his turn to use the circuit. The problem was to save the time that the 600 men spent in waiting their turn. Teletype developed a device known as the SECO (SEquential COntrol) which permitted each man to punch his report out on a tape, then put the tape in a transmitter and go about his other duties. Meanwhile, the SECO at the central receiving machine automatically turned the transmitters on in their proper rotation, thus picking up the messages that had earlier been punched on the tapes. If one man's tape wasn't ready, the SECO would wait two seconds, then go on automatically to pick up the report from the next station. The SECO, incidentally, was soon after tailored to meet special Bell System needs and is known as the SOTUS (Sequentially Operated Teletypewriter Universal Selector) used in 81-Type automatic telegraph switching systems.

Complete Manufacturing Facilities

TELETYPE'S emphasis on the specific needs of its customers in its research and development work is equally apparent in its manufacturing activities. In the manufacture of its products, the basic mass production techniques of standardization, precision, interchangeability, and highly specialized processes are carefully blended with the "tailoring" of an extremely wide variety of end products to serve individual customers' needs. For instance, the typing unit of the Model 15 Printer (known by Teletype people as their "bread and butter" product), may be assembled to embody about 150 different combinations of features and accessories that customers may require. And the typing unit is only one of several units that comprise the Model 15 Printer.

A visit to Teletype's plants is strikingly similar to a visit to any of Western Electric's manufacturing locations. You'll see punch presses at work and men using delicate gauges and instruments for measuring to within .0001 of an inch (on punch blocks for tape perforators); benchrows of employees doing delicate wiring and assembly operations, and rooms in which draftsmen sit at drawing boards designing tools and products. There is a heat-treating area where piece-parts and tools are hardened in cyanide or in salt baths at

temperatures up to 1600°F., and where tiny piece-parts are relieved of inner strains in electric furnaces. Most of Teletype's heavy manufacturing operations take place in the main plant on Wrightwood Avenue. These include tool-making, heat-treating, and piece-part manufacture. Light operations, assembly, final testing, and packing are performed at the smaller rented Fullerton Avenue plant.

Throughout the long chain of manufacturing processes that convert raw materials into a finished product, there are inspection operations each step of the way to insure high quality. Some of these are sample checks, following the Bell System pattern of statistical quality control, the basis of which is scientific sampling; others are complete inspections. On the Model 15 printer, by the time its 3800 parts have been made and assembled, some 7500 different inspections have been performed. Then comes the final test, with rows of newly assembled printers typing test messages, their bells ringing and sounding very much like the telegraph printer room of a large newspaper. This test covers 10,000 words of printing, after which the printers are readjusted when necessary; then another test of 5,000 words which every printer must pass with flying colors before it can be shipped to a customer.

On the last lap of the assembly line, typing units for Teletype's Model 15 printer—the Company's bread-and-butter item—receive a final adjustment

When the Model 15 Teletype printer's 3800 parts have been made and assembled, and some 7500 inspection operations have been performed, the final steps include a 10,000-word test, any necessary readjustment, and a final 5000-word test

Important Field of Communications

THE TELETYPE CORPORATION has numerous customers. The major portion of its products are supplied to various communications companies and, currently, the U.S. Government. The Bell System, Western Union, international telegraph companies, press wire services, and others in like fields combine Teletype machines with their extensive communications facilities and, in turn, offer complete and modern services on a leased or message basis to their many subscribers and customers.

The U.S. Government, in addition to utilizing these services of the communications companies, buys many Teletype machines outright for connection to Government-owned or Government-leased circuits. Military networks, thus arranged, encircle the globe, while several nationwide Civil Aeronautics Administration networks control movement of domestic aircraft and keep them supplied with up-to-the-minute weather information.

Numerous other customers serve their own communications needs by purchasing Teletype machines directly for use on their own wire facilities. Railroads are typical of this customer group.

Domestic sales of Teletype's apparatus are handled directly by Teletype's staff. Exception is made in the case of sales to State, County, and Municipal departments, which are handled by Graybar Electric. Cana-

dian and foreign sales of Teletype's products are handled through distributors serving the written communications field. Users served on a leased or message basis look to the respective communications companies for fulfillment of their needs. Teletype's sales activities include dissemination of information regarding the various products and their uses, and providing technical aid to customers and distributors in helping them select equipment most suitable for their specific needs.

Related services to customers include school training of their personnel on the maintenance of Teletype's equipment. In the classrooms of this school, located at the factory in Chicago, you may find students from the Army, Navy, railroads, Civil Aeronautics Administration, and other customers from all over the world. These class groups frequently include employees of Western Electric's distributing organization. (Much of the Bell System's Teletype equipment is prepared for installation and periodically overhauled in the shops of Western Electric's distributing houses.)

Related Product Employed by Publishers

TELETYPE HEADQUARTERS at Chicago is also the headquarters of its subsidiary, Teletypesetter Corporation, which has merchandised Teletypesetter equipment since 1932. This equipment (which utilizes the basic selection features employed in the present Teletype printer) is used in the printing and publishing field for the automatic operation of linecasting machines. Code combinations denoting the proper letters, characters, and composing-machine functions are first recorded in perforated tape. The tape is then fed into a Teletypesetter operating unit which activates the linecasting machine. With this equipment, a national magazine can have all its editorial offices in one location and, by means of wire transmission of the tape copy, go to press simultaneously in any number of distant cities.

The principal elements of a Teletypesetter system are the perforator, which has a keyboard very much like a typewriter, on which is punched the tape copy; and the operating unit, which is mounted on the linecasting machine and which automatically translates the tape perforations into the mechanical functions essential to the typesetting operation. Transmission of the tape copy from editorial room to composing room in either local or distant operation is accomplished through use of specially designed Teletype 6-unit code transmitting and receiving apparatus.

Firm Has Achieved Wide Recognition

INDUSTRIES which use Teletype's products depend on them heavily. The speed with which news is disseminated by the great press services is made possible by Teletype equipment. Railroads use this equipment to keep track of freight and car movements. Many manufacturing industries use Teletype equipment to communicate from one plant to another, even from one office to another within a plant. Western Electric, incidentally, has a large installation of

this type, and so, appropriately enough, has the Teletype Corporation. These are private line users. As for TWX subscribers, there are over 26,000 subscriber stations, serving almost every activity that makes up the American economy.

The nation as a whole also depends heavily on Teletype's products in the day-to-day operation of its government and armed forces. State and local police flash descriptions of wanted criminals throughout the country, weathermen of the C.A.A. send up-to-the-minute reports in to headquarters from their far-flung posts, and other government agencies use Teletype just as extensively as industries do. The Teletype Corporation, with its two manufacturing plants in Chicago and its 1,800 employees, plays a role in the nation's communications far out of proportion to its modest size.

This, to a great extent, is a tribute to the management and employees of the two early companies of which the Teletype Corporation was formed. It is no less a tribute to those of today who energetically carry on Teletype's tradition of building newer and better machines for printed communications, and to the Bell System environment in which Teletype employees have lived since 1930—an environment in which are intimately coördinated the functions of research, supply, and operation.

IT'S ONE O'CLOCK in the morning. You're on your way home alone, and your footsteps echo flatly on the pavement.

The street spreads away before you, empty and silent. The wind scuffs up a paper behind you, and you jump a little.

Then you laugh at yourself, and as the vacant, darkened windows of the buildings on either side gape down at you, you think, "Boy, this town is *really* asleep—not a creature stirring—not even a mouse. . . .

"But wait a minute! There's a light in that building over there. Wonder who's up? Maybe somebody forgot to turn it out."

And then it comes to you. That's the telephone building. No one forgot to turn out that light. It never goes out the whole night long. And as you walk on down the street, you think about it.

You think about what that light means. About wires and cables and switchboards. But more than those, you think about the people who are ready at all times to speed the messages through—to serve their community and their nation. What does it all add up to, you ask yourself? *Security*. Your footsteps beat out the word. *Safety,* they tap. *Preparedness,* they echo.

"Other lights go on and off," you say to yourself. But that light keeps on burning. And as other lights burn longer too, these days, in factories and shops working on vital production needs, you realize that telephone men and women in this town and towns everywhere are working with them around the clock —providing a service that can be depended on to unite the people in their common aims, to get things done quicker, to play its full part in any task to which America sets its hand.

Telephone Story heard on the "Telephone Hour" radio program

Twenty-five Years Ago in the

BELL TELEPHONE QUARTERLY

Items from Volume IV, Number 4, October 1925

The Bell System Coöperates in Defense Tests

ON JULY 4, 1925, the Bell System participated in the exercises of Defense Test Day by placing at the disposal of the military authorities a considerable portion of its long distance telephone facilities.

Its contribution to the communication features of the program included the linking of Washington, New York and Chicago by long distance telephone lines for two-way conversation, making possible addresses at all three points.

The program was opened at 9:00 P.M. by Major General Charles McK. Saltzman, Chief Signal Officer of the Army, presiding at the office of the Secretary of War at Washington. A report covering the military mobilization carried on as part of the test in the eastern part of the country was made by General Charles P. Summerall, Commander of the Second Army Corps Area, at New York, and a similar report, covering the western part of the country, was given by Major-General Harry C. Hale, Commander of the Sixth Corps Area at Chicago.

Addresses were delivered from Washington by General John J. Pershing and Major-General John L. Hines, Chief of Staff; from Chicago by Vice-President Charles G. Dawes; and from New York by Acting Secretary of War Dwight F. Davis, and Walter S. Gifford, President of the American Telephone and Telegraph Company.

Twenty-eight broadcasting stations were connected with the circuit and made the entire program available in all parts of the country. This was the largest number of stations ever connected for simultaneous broadcasting.

To demonstrate the usefulness of the process of sending pictures by wire, developed by Bell System engineers, two telephotographs were transmitted from San Francisco to New York for development and delivery at Washington. One of these, a map of the line of march from the Presidio to the civic center, San Francisco, was of particular interest to military authorities as illustrating the value of the telephotograph system in transmitting maps, drawings and other data in an emergency.

From "Notes on Recent Occurrences"

More Dependable Service by Cable

THE NEW YORK-CHICAGO CABLE means protected, stabilized service.

Leaving Manhattan by way of the Hudson tunnels, the new cable strikes westward across New Jersey, Pennsylvania, Ohio, Indiana, an eastern corner of Illinois.

Under rivers and cities it runs, over hills and mountains, through pastures and orchards, leaping ravines and quarries, following highways here and abruptly taking to forests there, hugging railroads for a time and then spurning lower levels to fling its giant silvery thread across the top of a rock-strewn ridge.

The man who would follow this almost unique line must be ready to ride an airplane; and even so, he must be prepared to report that he missed nearly a hundred and fifty miles of its length, since that much of it is snugly under ground.

What does it mean to the telephone man, this great new cable link, this long

stride forward in the furnishing of the nation's long distance service?

First of all, it means that another of his larger visions has come true. In this case, as in every other major project of the System, it means that problems of the first importance have been solved. Nearly a decade ago the general plans were made. Then came the careful consideration and decisions of executives; then the underlying work of engineers, inventors and scientists; then the skilled efforts of designers, manufacturers, installation and construction forces; and finally the maintenance and operation of this new link in the System by the trained people whose responsibility it is to keep it continuously working at full efficiency in the service of the public.

From an article by T. T. Cook, then Assistant to the Director of the Long Lines Department

The Bell System

THE OBJECTIVES or the ideals of the Bell System may be considered to be fourfold in character. First, to give to the people of the United States the best and most comprehensive and satisfying telephone service which can be given to them.

Second, to bring out in each of the 350,000 workers in the Bell System the best that is in him or her so that that best will be devoted to the problem of giving telephone service to these United States.

Third, to make a fair return to the more than half million people who have provided the money necessary to build the telephone plant which is essential to the rendering of the service.

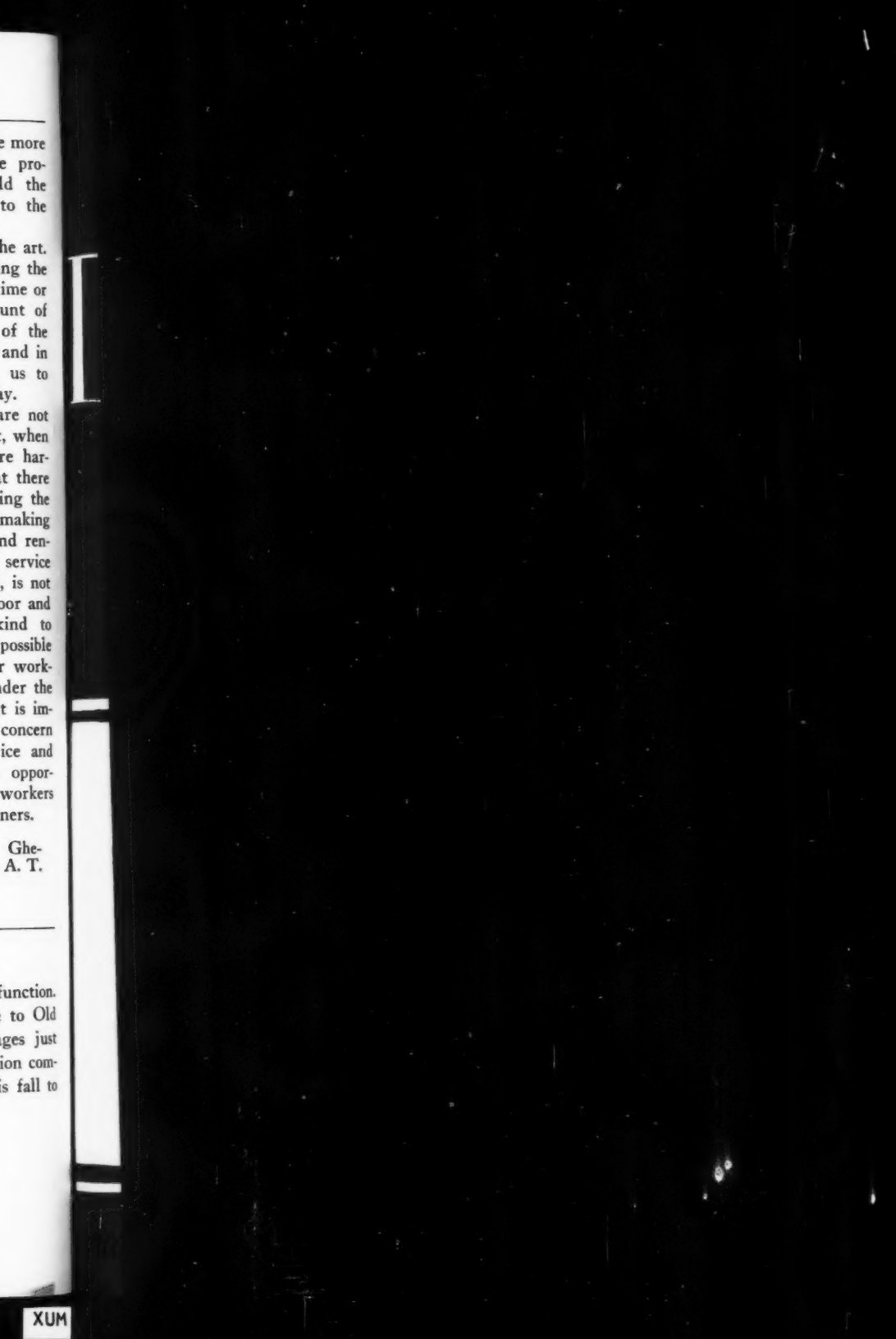
Fourth, to continuously develop the art. We cannot rest satisfied with applying the telephone art as it is from time to time or as others may create it. On account of the large proportion that we are of the total industry in the United States and in the world, the obligation rests in us to develop the art in every possible way.

Those four objectives or ideals are not inconsistent with each other; in fact, when properly regarded they are in entire harmony. It is sometimes thought that there is some inconsistency between treating the owners of the property fairly and making money for them on the one hand and rendering the best and most satisfying service on the other hand. Such, however, is not the case. It is not possible for a poor and ill-nourished institution of any kind to render the best service. It is not possible for an institution, the employees or workers of which are dissatisfied, to render the best service. On the other hand, it is impossible in the long run for a concern which does not render good service and improve its service intensively as opportunities offer either to make its workers happy or to make money for its owners.

From an address by Bancroft Gherardi, then Vice President of the A. T. & T. Company

Who's Who & What's What

(*Continued from page 135*)

occasionally, things like stories on the dual relationship of Teletype Corporation as a Western Electric subsidiary and teletypewriter service as a Bell System function. His article on "Giving New Life to Old Equipment" appeared in these pages just a year ago. His present contribution completed, he left the Bell System this fall to pursue further studies abroad.

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